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OSLER IN AMERICA: WITH ESPECIAL REFERENCE TO HIS BALTIMORE PERIOD*

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OF his life of a little over seventy years William Osler spent fifty-five years in Canada and the United States. It is of this American period (1849-1905), and especially of his life and work in Baltimore, that I have been invited to speak. Because of the compulsory brevity the task of selection and of elimination has not been easy, especially when one thinks of the manifold activities of his life and reviews them in the many tributes to his memory from his former colleagues in Montreal, Philadelphia, and Baltimore which have been published since his death in 1919. For full accounts of his life, the delightful and definitive biography written by Dr. Harvey Cushing, the charming life penned by his friend and great admirer, Mrs. H. F. Reid, and the Memorial Volume of the International Association of Medical Museums, edited by Dr. Maude Abbott, are available. You will, therefore, not expect more than is possible in my brief summary; but if I can present to you the more prominent features of the American period of the life of him to whom, after passing in review all other great physicians who by their lives, their practice, their teaching, their writings, and their influence over the greatest number of their fellows were outstanding, Dr. Adami awarded the first place in the world, I must fain be content.

This American period of Dr. Osler extends from his birth in the parsonage at Bond Head in Upper Canada on July 12, 1849, to the time of his departure for Oxford in 1905. He was the eighth of nine children, of whom at least five led lives of great distinction. His preliminary education was gained in the schools at Bond Head, Dundas, Barrie, Weston, and Trinity College during which period he was profoundly influenced by the nature-lover, the Reverend William Arthur Johnson, and the physician of diverse interests, Dr. James Bovell, whose name he was throughout his life ever scribbling on his notes and in his books. He received his undergraduate medical education in Toronto and in Montreal, where he came under the influence of Dr. R. Palmer Howard and other leading medical men. During postgraduate studies in Europe he profited by work in experimental physiology and pathology under Burdon-Sanderson (whom he was to succeed thirty-four years later as Regius Professor), and he came into contact with the active clinicians and pathologists in England, Scotland, Berlin and Vienna. Returning to Montreal, he taught physiology, pathology and, later, internal medicine there.

In 1884 he began the five years of his life in Philadelphia, becoming Professor of Clinical Medicine at the University of Pennsylvania. Besides teaching medicine and starting a clinical laboratory in the University Hospital he made many autopsies at Blockley, and carried out important investigations in the Orthopædic Hospital. After this, he spent sixteen years in Baltimore as Physician-in-Chief to the Johns Hopkins Hospital and Professor of Medicine in the University, until he finally left America to become the Regius Professor of Medicine in Oxford.

* The Third Osler Oration, slightly abridged, delivered at the joint meeting of the Canadian Medical Association and the American Medical Association, Atlantic City, June 13, 1935.

OSLER AS STUDENT AND AS PROMOTER OF RESEARCH

From early childhood he was impelled by curiosity and the desire to know. Though his interests were general and diversified rather than special and circumscribed, he showed an extraordinary power of concentration when dealing with anything that attracted his attention. He stood in the first rank in the schools he attended, and, as a boy, quickly became interested in extra-curricular matters, collecting, tabulating, and describing fossils, minerals, plants and animals, and early learning microscopical technical methods under Father Johnson's supervision and the stimulation of Dr. Bovell. His studies of diatomes and of fresh water polyzoa afforded the materials for his earliest scientific publications, the beginning of what he called his "ink-pot career". He was a keen observer, always on the lookout for new things, as was shown by his recognition of *Trichina* in the muscles of a cadaver he was dissecting in the Toronto School of Medicine (1870), and by his isolation of no less than 159 cysts from a single drachm of one of the muscles of the arm.

Though Toronto was later to develop an excellent clinical school under Graham and McPhedran, Osler, for his clinical undergraduate work, went in 1870 to Montreal, where at McGill in the out-patient department, at the bedside, and in a clinical clerkship, he came under the instruction of Dr. R. Palmer Howard and Drs. Wright, MacCallum and Drake — all good teachers; Dr. Howard, Father Johnson and Dr. Bovell were the three men to whom he attributed his success in life, "if success means getting what you want and being satisfied with it".

After winning a special prize for his graduation thesis and being placed first in his class in order of merit, one of his brothers provided him with funds for post-graduate studies in Europe. Though he visited the principal clinics in England, Scotland, Berlin, and Vienna, and contrasted the methods of the teachers in different countries, his most serious studies were conducted in Burdon-Sanderson's laboratory, where he was the first to observe as discrete particles in the circulating blood the small elements that later came to be known as blood-platelets. He believed strongly that every medical man should at intervals get away for a post-graduate study somewhere for what he called a "quinquennial brain dusting". And he set the example himself to his assistants.

After joining the faculty in Montreal, he made the autopsies on those who died in the hospital, recorded in his own hand-writing the protocols in several large folio volumes, and exhibited many of the specimens at meetings of the medical society. This extensive work in pathology in Canada, followed by a similar experience at Blockley in Philadelphia, gave him thirteen years of autopsy work — an excellent foundation for a clinician. It was during this time that he studied the brains of two criminals and disproved the assertion of Moritz Benedikt, of Vienna, regarding an especial deviation from the normal convolutional form. In 1881 he recognized the mycotic origin of certain aneurysms, recording the first case, and he read a paper on ulcerative endocarditis describing micrococci in the vegetations on the valves, the basis of his Goulstonian lectures later; subsequently, he was to describe the transitory cutaneous nodules that appear in the disease, now known as "Osler nodes". In 1882, with A. W. Clement, he studied the parasites of the pork supply of Montreal, and urged governmental inspection to prevent the transmission to man of trichina, cysticercus and echinococcus. Though his early studies of malaria made him skeptical of Laveran's findings, he later confirmed them, and after he reached Baltimore he and his students made extensive studies of the disease and of the life-history of its causative protozoa, doing away with the all too common diagnosis of malarial fever and routine treatment with quinine, except in cases in which the presence of the parasites could be demonstrated microscopically.

After 1889, he devoted himself assiduously to clinical researches, among which may be mentioned his studies of typhoid fever and its complications, and his investigations bearing upon abdominal tumours, upon sporadic cretinism, upon Huntingdon's chorea, upon the cerebral palsies of children, upon ochronosis, and, especially, upon two diseases that bear his name—(1) cyanosis with polycythæmia, and (2) hereditary multiple telangiectasis associated with hæmorrhages.

Fully as important as his personal studies for the advancement of scientific knowledge was

his heuristic influence upon others. He was always stimulating his assistants and his pupils to undertake research, and rejoiced in the contributions of Lafleur, Thayer, Futcher, McCrae, Opie, MacCallum, Bardeen, Brown, Hamman, Emerson, Cole, and others. He was instrumental in helping to secure the appointment of commissions for the study of yellow fever in Cuba, of dysentery in the Philippines, and of bubonic plague in San Francisco. Perhaps the influence of greatest moment for investigation that he exerted was that upon Mr. F. T. Gates (the adviser and representative of Mr. John D. Rockefeller), who wrote Dr. Osler that the establishment of the Rockefeller Institute for Medical Research in New York and a gift of a million dollars to the Harvard Medical School both grew directly out of the text-book he wrote.

OSLER AS TEACHER

Early in his own life Osler had found that the master-word in medicine was "work"; in steady daily toil he found his own greatest pleasure. He urged his pupils to work hard at something in which they could find enjoyment; when necessary, to scorn delights and live laborious days; to learn the art of detachment, the virtue of method, and the importance of the quality of thoroughness; and, at the same time, to value the grace of humility. His success as a teacher lay largely in the inspiration and stimulation of the example he set. Dr. Welch once said that he doubted whether the history of medicine records a man who had greater influence upon the students who came under his teaching.

Osler early discovered that the highest art of teaching lies in inducing students to learn by doing things themselves, by systematically using their own sense-organs of sight, hearing, smell, taste and touch, by coming into close personal contact with the objects of study in laboratories, out-patient departments and hospital wards, and by keeping accurate records of the observations made. Though he did not underestimate the value of lectures, of demonstrations, and of well-selected reading, he always laid most stress upon the student's more direct activities in relation to things and persons as they daily came before him.

In hospital work under Osler the medical students became immediately a responsible part of the working force. In the out-patient department they took histories, made physical examinations and laboratory tests upon the "unwashed" applicants; in their fourth year, they practically lived in the hospital wards, serving as clinical clerks, making diagnoses themselves, and planning treatments, subject of course to the close scrutiny and criticism of the medical house-officer and visiting staff. The teaching tended accordingly to be concentrated upon the clinical material that was most abundant—upon typhoid and malaria in the summer and autumn, upon pneumonia and other respiratory infections and arthritis during the winter months. "Typhoid committees" and "pneumonia committees" were formed; they listed all the cases, recorded the complications that developed and the methods of treatment that were followed, tabulated the results, and reported at regular intervals to the whole class.

No attempt was made to cover the whole field of medicine in the course, for the time allotted to undergraduate instruction was far too limited for that. Osler knew the folly of expecting more from students than was possible; as he once said, "we can only instil principles, put the student in the right path, give him methods, teach him how to study and early to discern between essentials and non-essentials". At his ward rounds he listened to the clinical clerks' reports, controlled the physical findings by personal examinations of the patients, and discussed, usually epigrammatically, the implications, often sending students to the library for important references bearing upon the conditions under study, to the pathological museum for illustrative specimens. Once a week he entertained the active clinical clerks at his own home, and, over beer, crackers and cheese, discussed with them the interesting things of the week. These were delightful occasions, promoting more intimate acquaintanceship; he made use of them, also, for stimulating the interest of the students in the historical development of medicine and for infecting them with the germs of bibliomania.

OSLER AS PRIVATE PRACTITIONER

Private practice was never more than a subsidiary activity in his busy life. He early had to do some private work to supplement his income, but as his experience and reputation grew he was forced to see more private patients than he wished to. On his return from Europe in

1874, at the age of 25, he substituted temporarily for local practitioners in Dundas and in Hamilton, receiving fifty cents as his first fee for the removal of a "speck in the cornea". On entrance upon teaching in Montreal he opened an office, but he saw very few private patients there, and even those who came were not likely to find him in. At times he had to borrow money for running expenses, for, as he amusingly said, he "suffered at that time from acute attacks of chronic impecuniosity". It was not long, however, before his colleagues began to seek his aid in the diagnosis and treatment of obscure cases, a practice that began in Montreal, continued in Philadelphia, and became greatly increased in Baltimore. After his text-book attained to wide distribution, physicians throughout Canada and the United States referred patients to him, and often requested him to travel long distances for consultations. Miss B. O. Humpton, his faithful secretary for many years, remembers the artfulness with which he escaped from many of these appeals and the development of his habit of turning many applicants over to trusted associates. He gave of his best to aged patients and to those who suffered from chronic or hopeless maladies. In Baltimore he restricted his consultations with physicians in the city to the late afternoon hours; but the number of patients thus seen, in addition to those who entered the private rooms in the hospital under his care, soon became a serious load. He got the reputation, too, of being the "doctor's doctor"; no small proportion of his total private clientèle was made up of medical men and members of their families. It was finally the increasing pressure of the burden of practice that made him decide to accept the Oxford call in 1905; as he said, he was tired of the daily grind of consultations, and thought he would get out while there was still some "elasticity in the rubber".

OSLER AND PUBLIC HEALTH

No account of Osler's life in America should omit reference to his activities in the promotion of public health and in the prevention of disease in both men and animals.

In his early work in Montreal, his studies of trichinosis and of intestinal parasitism led him to participate in a vigorous campaign for strict governmental supervision of the sources of foods, and he emphasized especially the necessity of systematic inspection of meats. This campaign, as Cushing has said, probably had great weight, since it came from a physician holding no political office. In his studies of an epidemic that had broken out in a drove of 300 hogs near Quebec, and which was supposed to be either anthrax or pig-typhoid, he showed by autopsies and inoculation experiments that it stood in no relation to either of these maladies, but was an independent disease, thus throwing much light upon hog cholera. In Montreal, too, he made careful studies of small-pox, especially of the initial rashes and of the malignant hæmorrhagic type, and joined the ranks of those who strongly urged vaccination and quarantine, measures that were not yet compulsory.

In Philadelphia and in Baltimore, finding the hospital wards crowded every autumn with typhoid patients, much of his energy was devoted to participation in a campaign for improved sanitation. He pointed out the necessity of regular inspection of the conditions of milk-production, of prevention of contamination of water-supplies by control of water-sheds and by adequate methods of disposal of sewage, and of compulsory reports of the occurrence of cases to the State Board of Health. A few years later (in 1899) he made a vigorous address upon "The Problem of Typhoid Fever in the United States", because of the great outbreak of this preventable disease throughout the whole country, owing to the shameful and criminal neglect of the principles of public sanitation. He did his best to arouse the people and the medical profession to a sense of their grave responsibilities, pointing out the fact that the United States was a generation behind the better parts of Europe in sanitary measures. Others joined in the campaign, and, as everyone knows, the conditions that favour the spread of typhoid fever have since been largely abolished in both the United States and Canada, so that the disease is becoming relatively rare.

Another outstanding example of Osler's public health activities was his participation in the fight against tuberculous infections. From the time when he began to make autopsies in Montreal onward, he was ever interested in the nature and mode of spread of the tuberculous diseases. He secured funds for researches upon tuberculosis, for home visitation of tuberculous patients, and for social service work among

them; encouraged men like C. B. Parfitt, L. Brown, J. H. Pratt, and L. V. Hamman to devote themselves especially to the study and control of the disease, helped to secure the creation of a State Tuberculosis Commission and of a Maryland Tuberculosis Association, organized the Laennec Society in the same interests, was among those who along with Trudeau and Biggs planned the organization of the National Association for the Study and Prevention of Tuberculosis in this country, attended the International Congresses, engaged personally in campaigns for awakening the American people to the importance of the problems involved, and made the general practitioner everywhere alive to the fact that he must be a leader in the battle against the scourge. It is possible that the establishment of the Henry Phipps Tuberculous Institute in Philadelphia was in part due to the influence of Osler who was physician to one of Mr. Phipps' children, and certainly Mr. Phipps' gift that was used for the Tuberculosis Dispensary at Johns Hopkins was sent through Dr. Flick directly to Dr. Osler.

In all these and in many other ways he played a significant part in the furtherance of public health in America; his activities were impressive of the claims of the community above those of individual interests. In Max Brödel's drawing bearing the legend "The Saint — Johns Hopkins Hospital", Osler is represented with halo and wings, as Cushing says, "dominating a cyclone which swept away disease".

OSLER AS ORGANIZER

Success in the many activities in which he participated would have been impossible had he not been a man of unusual executive ability.

This ability to organize successfully was shown in Montreal, underwent further development in Philadelphia, and reached its maximum of efficiency in middle life in the development of the medical clinic in Baltimore. It was four years after he came to the Johns Hopkins Hospital before its medical school could be opened. This period permitted him, unhampered by undergraduate teaching, to organize the work of his clinic in accordance with his ideals. For the first time America had a medical clinic that was the equal of, if not superior to, any other in the world. Its successes were so outstanding that its main methods of organization were, as soon as possible, adopted in other large medical clinics in Canada and the United States, so that internal medicine in America rapidly attained the high position that it now enjoys.

It will be remembered, too, how active he was in instilling new life into existing medical societies (like the Medical and Chirurgical Faculty of Maryland, for example, which has dedicated its meeting place "Osler Hall" in tribute to his memory); and how, also, he was ever starting new societies to promote special medical interests, including the Laennec Society for the study of tuberculosis, the Book and Journal Club, the Medical Historical Society, and the Interurban Clinical Club that brought young internists of several cities into fruitful cooperation. He showed, also, an enduring interest in the American Medical Association, in the Association of American Physicians, in International Medical Congresses, and in the International Association of Medical Museums.

OSLER AS WRITER AND AS BIBLIOPHILE

How he found time for his great literary productivity is a question that has intrigued all students of Osler's life. That he was able to write some 730 articles and several books seems almost incredible, but he did, as will be seen by consulting the lists of his publications prepared by Miss Blogg, Dr. Maude Abbott, and others. Without his extreme systematization of his life, and without his extraordinary powers of concentration, such a literary output would have been impossible.

His "Principles and Practice of Medicine" enjoyed a greater vogue than any similar text-book; no less than 23,000 copies of the first edition were sold; each of its many revisions, the sixth appearing just before he left America, was widely distributed. The translations into French, German, Chinese, and Spanish increased its influence throughout the world. After he had signed the contract to write his text-book, he amusingly accused himself of "selling his brains to the devil"! In 1904, he began the editing of a "System of Medicine", assisted by McCrae, a six volume treatise that has passed through several editions. Of his smaller books, his "Lectures on Angina Pectoris" and his "Cancer of the Stomach" (with McCrae) were much appreciated by the profession. In 1904, he embodied a selection of his more interesting essays in a 388 page volume entitled "Æquanimitas and Other Addresses"; they are as interesting

today as when they were composed. And the physician or medical student who has not yet read his "Counsels and Ideals" (selected and edited by C. N. B. Camac) has a rare treat before him.

As a friend of books the young Osler got his start when, as a boy of eighteen, as a result of the influence of Father Johnson, he bought his first copy of the *Religio Medici,* and before he left America he had collected 55 editions of that famous volume. He early formed the habit of reading a half-hour or more in bed on retiring and, as a young man, he steeped himself in the Bible, in Sir Thomas Browne, in Milton and in Shakespeare. Later on, he became a devotee of Plato and of the greater English poets. He was an omnivorous reader, made notes of what he read, and enriched his own writings with apt quotations from his favourite authors. As Francis R. Packard has said, he was the first great American medical teacher to exert an extra-professional cultural influence on his students and followers. It is no wonder that he became a great friend of medical and other libraries and by word and example contributed to their upbuilding.

OSLER—THE MAN

Physically, he was slender, graceful, of medium height, rather thick-set, of olive complexion, had keen, sparkling eyes and a voice of pleasant tone. Of Cornish extraction, he was to Arthur Keith the "Mediterranean type of man". Psychically, in addition to his unusually strong and many-chambered intellect and to his powers of concentration, application, and memory, he was blessed in extraordinarily high degree with the better temperamental attributes that tend to be associated with that type of physical make-up; quick in thought and in action, normally uninhibited, warm-hearted, optimistic, joyous, youthfully buoyant, generous, sympathetic and convivial, he saw the best in everything and everybody, and was pervaded by a strong sense of humour—qualities that in their combination endeared him to all and inspired the loyalty, the devotion and the affection of those who knew him, and especially of those who worked with him. Despite his enthusiastic nature, there was no pathological exuberance or loquacity; he was aware of his own limitations; he knew when to be taciturn; he was sufficiently imperturbable, and he cultivated a sensible equanimity. He was not devoid of an underlying tinge of melancholy, and, in moments of sadness, often "whistled that he might not weep". He was always immaculately dressed, and in Baltimore was a conspicuous figure in his tall silk hat and Prince Albert coat with a carnation in the button hole.

Character and personality are defiant of exact analysis, and there was something about the special gift of the gods, the Oslerian humanistic spirit, that all who knew him felt but none could accurately define. Those who missed the opportunity of enjoying the natural charm of his presence can probably never understand fully what he meant to his friends nor realize the reasons for the quickening and pervasive influence he was able to exert upon single persons. As Thayer, in a beautiful sonnet, has said, he had: "A heart whose alchemy transforms the dross of dull suspicion to the gold of love".

In addition to his fortunate inborn tendencies, there entered into him a part of all that he had admired in literature and had met in life—the best books of the past and the better people of his own time. His conversation was full of apt quotations from, and quaint allusions to, his favourite authors. At every opportunity, too, he praised the work of some admired contemporary, for, in his opinion, praise of the good exerted as a rule a far better influence than denunciation of the bad. This was a part of his genius for friendship. He rarely gave expression to his dislikes, though those who knew him well realized his hatred of humbug, of deceit, and of malicious gossip. He excelled in his power of harmonizing rival medical groups in Philadelphia, and in Baltimore, an influence that still bears fruit among his many disciples.

In early boyhood he was full of fun and prankishness. Because of his mischievous impishness he was expelled from the grammar school in Dundas, and later, at boarding school, became one of "Barrie's bad boys", and at Weston, with nine other boys, was fined and sent to jail for three days for "smoking out the matron"! In adulthood he never lost his spirit of fun, and continued to play harmless practical jokes upon his friends and others. Under the *nom de plume* of "Egerton Y. Davis of Caughnawaga", he would register at hotels to preserve his privacy, or would contribute letters to medical journals reporting obviously

fictitious and impossible cases! Once he got reporters after the grave Professor Delafield by telling them that he was an expert baseball player. On another occasion, when asked why Mrs. Osler was not with him at church, he declared that it was because she was a Buddhist and would not come. His propensity to relieve the serious with humour and with whimsical paradoxes sometimes got him into difficulties; as he told Professor Gildersleeve in later life, "The way of the jester is hard". In his address on the "Fixed Period", when he himself was fifty-five years old, and throughout his life had been devoted to old men, he spoke of the advantages that Anthony Trollope had suggested might accrue to the world by chloroforming men at sixty, and was wholly unprepared for the storm of protest that followed, awaking, he said, to find himself "infamous". He sought temporary isolation at the seashore and wrote me that he was there "sitting like Plato under a wall, waiting for the storm to pass".

His home life was ideal, for his charming wife understood him, protected him from the troublesome importunities of the pertinacious, and arranged for and supplemented the generous hospitalities of his open house. His boy, Revere, brought him great joy, though his death in the War was also the occasion of the heaviest sorrow of his life. It was characteristic of him that he should have established as a tribute to his son's memory the "Tudor and Stuart Club" at the Johns Hopkins University for the cultivation among undergraduates of the love of good literature. One of the pleasing photographs of Dr. Osler in Baltimore shows the young Revere riding upon his back. His love of children in general, and the way they adored him, have been beautifully described in a special chapter of the biography written by Mrs. Reid. He kept personally young himself by "playing with the boys" and one of the absorbing passions of his life was, as we have seen, to aid young medical men in their development.

When the call to Oxford came in 1905, Mrs. Osler urged him to accept it knowing that the strain of the life in Baltimore had become altogether too great to be longer borne. His three valedictory addresses are among his most memorable productions. In them he reiterated his belief that scientific advances of the first rank must be made by young or comparatively young men, extolled the pleasures of the "student life", and urged the promotion of "unity, peace and concord" among the members of our profession. He admitted that he had made mistakes, but they had been "mistakes of the head, not of the heart". And all agreed with him when in his closing statement regarding his sojourn in America, he said: "I have loved no darkness, sophisticated no truth, nursed no delusion, allowed no fear".

Many have felt that his most outstanding characteristic was his extreme kindness, and one of his friends when speaking to me recently about him referred to the verse:

> "So many gods, so many creeds,
> So many paths that wind and wind
> When just the art of being kind
> Is all the sad world needs."

No physician who has dwelt among us more than William Osler deserves to be classed among the "immortals"; his memory will surely be cherished and reverenced during the generations to come.

Opinion rides upon the neck of Reason, and Men are Happy, Wise, or Learned according as that Empress shall set them down in the Register of Reputation. However, weigh not thyself in the scales of thy own opinion, but let the Judgement of the Judicious be the Standard of thy Merit.—Sir Thomas Browne.

Though a contented Mind enlargeth the dimension of little things; and unto some 'tis Wealth enough not to be Poor; and others are well content if they be but Rich enough to be honest, and to give every Man his due; yet fall not into that obsolete Affectation of Bravery to throw away thy money, and to reject all Honours or Honourable stations in this courtly and splendid World. Old Generosity is superannuated and such contempt of the World out of date.

—Sir Thomas Browne.

Let Age not Envy draw wrinkles on thy cheeks; be content to be envy'd, but envy not. Emulation may be plausible and Indignation allowable, but admit no treaty with that passion which no circumstance can make good. A displacency at the good of others because they enjoy it, though not unworthy of it, is an absurd depravity, sticking fast unto corrupted nature, and often too hard for Humility and Charity, the great Suppressors of Envy.

—Sir Thomas Browne.

Look humbly upon thy Virtues, and though thou art Rich in some, yet think thyself Poor and Naked without that Crowning Grace which thinketh no evil, which envieth not, which beareth, hopeth, believeth, endureth all things.—Sir Thomas Browne.

THE GALACTOSE TOLERANCE TEST AS AN AID TO DIAGNOSIS IN JAUNDICE*

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THERE is often considerable difficulty in differentiating between jaundice due primarily to damage of the liver parenchyma (toxic and infective jaundice) and that due to mechanical obstruction to the flow of bile (obstructive jaundice). Recognition of the type of jaundice is important, since surgical treatment is usually indicated in obstructive jaundice, whereas in toxic and infective jaundice operation is not only as a rule unnecessary but may be harmful. In spite of the many tests of liver function, differentiation of the types of jaundice is, as yet, largely dependent upon clinical signs and symptoms. The latter, however, have their limitations. Therefore, efforts are still being made to devise laboratory tests as an aid to diagnosis.

One important cause of failure of tests of liver function as aids to diagnosis is the fact that obstruction to the flow of bile leads in time to damage of the liver cells. Infection of the biliary tract, which commonly accompanies obstruction, also leads to parenchymal damage. As a consequence, liver function tests tend to show impairment, whether the jaundice is obstructive, toxic or infective. Of all available tests that of galactose tolerance, introduced by Bauer,[1] seems to yield the best results. As there are a number of excellent reviews in the literature,[2, 3, 4] no review will be given here. The purpose of this paper is to outline the principles and method of this test, and to discuss the factors which must be considered in the interpretation of results.

The galactose tolerance test is based upon the apparently exclusive ability of the liver to convert galactose into glycogen; tissues other than the liver appear to have little or no means of utilizing galactose. Thus, when a normal person is given 40 grams of galactose by the mouth the greater part of the ingested sugar is brought to the liver and there converted into glycogen. That which the liver fails to store passes into the general circulation and is excreted in the urine. In contradistinction to glucose, there appears to be no renal threshold for galactose. Therefore, the amount of galactose found in the urine should, theoretically, afford an index of the liver function, at least with respect to this sugar. There are, however, a number of factors, other than liver damage, which may influence urinary excretion of galactose and, if possible, should be considered in the interpretation of tests. These will be discussed later. There are also some, the influence of which is difficult to estimate. Diet, for example, is known to affect the capacity of the liver to store glycogen. Absorption of the ingested galactose from the gastro-intestinal tract is another factor; and the possibility that galactose may be utilized, at least to some extent, by tissues other than the liver, cannot be entirely ignored.[5]

The test is performed in the fasting state. Therefore, no food nor fluids of any kind, except water, are allowed for 12 hours before the test. At the beginning of the test the patient voids urine. This specimen is discarded. Forty grams of *chemically pure* galactose, dissolved in 250 c.c. of water (1 glassful), are then given by mouth* The urine is then collected *without loss* hourly for four hours, and each specimen is tested for sugar by Benedict's qualitative reagent. The specimens which contain sugar are then mixed and the total amount of galactose determined by titration with Benedict's quantitative reagent (25 c.c. of reagent = 54 mg. galactose)† If nausea or vomiting occurs the test must be repeated.

* From the Department of Metabolism, the Montreal General Hospital, Montreal, Canada.

Presented at the Clinical-Pathological Conference, the Montreal General Hospital, March, 1935.

* In our experience, it has not been found necessary to add any flavouring in order to avoid nausea, providing the drink is cold.

† In some investigations reported in the literature galactose was estimated by the polarimeter.

In the interpretation of the results, galactose excretions of 3 grams or less are regarded as normal. According to the literature, the consensus is that galactose tolerance is usually impaired in jaundice due primarily to damage to the liver cells (catarrhal jaundice, toxic hepatitis and cirrhosis of the liver), whereas, in mechanical obstruction to the flow of bile the tolerance is usually normal or only slightly impaired.

DISCUSSION

The findings in obstructive jaundice are summarized in Table I. It will be observed that the excretion of galactose was normal in 81 per cent of the tests; the amounts found were 3 g. or less. In about 16 per cent of tests the amounts ranged between 3.1 and 5 g. It will be noted that very large excretions, that is, more than 5 g., were met with in about 3 per cent of tests only.

TABLE I.

GALACTOSE TOLERANCE TESTS IN MECHANICAL OBSTRUCTIVE JAUNDICE

Author	*Reference No.*	*Number of Tests*	*Galactose Excretion (Grams)*				
			0-3.0	*3.1-4.0*	*4.1-5.0*	*5.1-6.0*	*6.1+*
Schiff and Senior	6	21	21	0	0	0	0
Rosenberg	7	16	16	0	0	0	0
Owen	8	10	10	0	0	0	0
Banks, Sprague and Snell	9	78	48	16	8	4	2
Tumen and Piersol	4	21	19	1	0	1	0
Shay, Schloss and Rodis	10	18	18	0	0	0	0
Wagner	11	17	14	2	1	0	0
Reiss and Jehn	12	7	7	0	0	0	0
Bensley	..	22	17	5	0	0	0
Total Number of Tests		210	170	24	9	5	2
Total Per cent		..	81.0	11.4	4.3	2.4	0.9

The following discussion is based upon the writer's experience with galactose tolerance tests during the last two years, as well as data from other clinics. For purposes of uniformity, only those tests are considered in which 40 grams of galactose were given and the urine was collected for at least four hours after giving the sugar. In all, the results of 684 such tests are presented. Cases of liver disease without jaundice are not included.

No relationship was found between the duration of the jaundice and the urinary excretion of galactose. This is contrary to expectation, since, as stated above, prolonged obstruction leads to secondary, and at times, severe injury to the liver cells. In a case of intermittent jaundice of four years' duration, due to papilloma of the common bile duct (Hosp. No. 2037-33), 0.8 g. only of galactose were found in the urine. In a case of persistent and intense

TABLE II.

GALACTOSE TOLERANCE TESTS IN TOXIC AND INFECTIVE JAUNDICE

Author	*Reference No.*	*Number of Tests*	*Galactose Excretion (Grams)*				
			0-3.0	*3.1-4.0*	*4.1-5.0*	*5.1-6.0*	*6.1+*
Schiff and Senior	6	124	32	21	20	17	34
Rosenberg	7	14	7	2	4	0	1
Owen	8	13	1	3	3	3	3
Banks, Sprague and Snell	9	53	31	6	9	2	5
Tumen and Piersol	4	68	31	10	8	6	13
Shay, Schloss and Rodis	10	17	1	6	3	3	4
Wagner	11	46	9	10	13	6	8
Reiss and Jehn	12	32	10	8	4	1	9
Neugebauer	13	33	6	6	5	6	10
Bauer	14	31	3	4	7	6	11
Bensley	..	43	13	4	7	7	12
Total Number of Tests		474	144	80	83	57	110
Total Per cent			30.4	16.9	17.5	12.0	23.2

jaundice of seven months' duration, due to carcinoma of the head of the pancreas (Hosp. No. 2815-33), 1 g. only was found in the urine. On the other hand, 4 g. of galactose were found in a case of jaundice of only two weeks' duration due to a stone in the common bile duct (Hosp. No. 2164-34). Banks, Sprague and Snell,[9] who reported most excretions greater than 5 g., found no relationship between excretion of galactose and the duration or intensity of the jaundice, or the post-operative course.

In Table II are recorded the findings in different forms of toxic and infective jaundice, namely, catarrhal jaundice, toxic hepatitis and cirrhosis of the liver. It will be noted that, in general, compared with obstructive jaundice, galactosuria was marked; excretions of more than 5.0 g. were found in about 35 per cent of tests. However, moderate excretions, that is, 3.1 to 5 g., were found in 34 per cent of the tests, and in 30 per cent the findings were normal.

TABLE III.

SHOWING NORMAL GALACTOSE EXCRETION IN CASE OF SEVERE TOXIC HEPATITIS (Hosp. No. 5721-34)

Date 1934	*Duration of Jaundice (days)*	*Plasma Bilirubin (mg. per 100 c.c.)*	*Blood Urea Nitrogen (mg. per 100 c.c.)*	*Blood Creatinine (mg. per 100 c.c.)*	*Galactose (grams)*
Oct. 2	8	4.0	84	4.28	0
" 5	11	1.4	34	1.50	1.0
" 9	15	0.6	20	1.60	1.5

Theoretically, providing the liver injury is slight, galactose tolerance in toxic and infective jaundice might be expected to be normal or only slightly impaired. Actually, however, normal or nearly normal excretions of galactose may be found in acute and severe forms of liver damage. One of our cases, (Hosp. No. 5721-34) is cited as an example. (See Table III). The possibility that the normal excretion of galactose in this case was due to kidney damage is excluded by the fact that the hyperglycæmic response to the ingested galactose was normal (See Table IV). In order to determine the degree of hyperglycæmia due to the galactose alone blood sugar determinations were made before and after fermentation with yeast. The procedure was that described by Somogyi.[15] Blood sugar was estimated by the Folin-Wu method. The method was controlled by recovery experiments; at least 90 per cent of galactose added to blood was recovered. That delayed absorption of galactose from the alimentary canal was not the cause of the low galactose excretion is suggested from (*a*) the return of the non-fermentable reducing substances of the blood to the fasting level at the end of two hours, and (*b*) the disappearance of galactose from the urine in the six hour sample. At the time of the test, although the bilirubin content of the blood was decreasing, the jaundice was still marked and the patient was toxic. It would, therefore, appear that there was little or no impairment of the ability of the liver to store galactose, in spite of the severity of the disease.

TABLE IV.

SHOWING BLOOD SUGAR TIME CURVE FOLLOWING ORAL ADMINISTRATION OF 40 GRAMS GALACTOSE IN A CASE OF SEVERE TOXIC HEPATITIS (Hosp. No. 5721-34)
(Test of Oct. 5th—Table III.)

Time	*Blood*		*Urine Sugar (Benedict's qualitative test)*
	*Total Reducing Substances (gms. per 100 c.c.)**	*Non-fermentable Reducing Substances (gms. per 100 c.c.)**	
Fasting	0.104	0.022	0
½ hr. after galactose	0.135	0.028	0
1 " " "	0.147	0.067	trace
2 hrs. " "	0.104	0.022	faint trace
3 " " "	0.093	0.023	very faint trace
6 " " "	.....	.....	0

*Expressed as glucose.

TABLE V.

SHOWING FINDINGS IN A CASE OF PORTAL CIRRHOSIS (Hosp. No. 6073-34)

Date	*Plasma Bilirubin (mg. per 100 c.c.)*	*Galactose Excretion (grams)*
Jan. 23/31	0.3	...
Jan. 30/31	0.1	...
Aug. 3/33	0.6	7.7
Aug. 9/33	0.3	6.2
Oct. 17/34	0.6	9.9
Oct. 19/34	0.3	9.1
Oct. 23/34	...	6.1
Feb. 18/35	0.6	6.6

According to Bauer[16] impairment of galactose tolerance in cirrhosis of the liver is probably always due to parenchymal damage. That damage of the liver cells in this condition may not be the only cause of large excretions of galactose, and that the latter may be due to

failure of the portal blood to reach the liver cells, is suggested from experiences with one of our cases of portal cirrhosis. Here there was a marked galactosuria, in spite of the fact that, judging from the general condition of the patient and the bilirubin content of the blood, liver injury was not severe. (See Table V).

Combining all of the data, the following appears to be a reasonably reliable method of interpreting galactose tolerance tests. When the test is performed under the conditions described above the finding of 5 g. of galactose or more in the urine definitely favours a diagnosis of toxic or infective jaundice, rather than jaundice due to mechanical obstruction; such large excretions rarely occur in the latter condition. Excretions of less than 5 g. of galactose are less significant; 4 to 5 g. suggest toxic or infective jaundice; less than 4 g. is of no significance, since it is a common finding in all forms of jaundice — toxic, infective or obstructive. The test should, however, be repeated. If the jaundice is of the toxic or infective type, a higher excretion may be obtained at a later date.

In the interpretation of results, a number of conditions other than liver disease must be considered; galactose tolerance may be impaired in hyperthyroidism, status lymphaticus, severe asthenia, marked neuroses, Addison's disease and long continued fever.[4]

Particular attention is drawn to diabetes mellitus. The galactose test is of no value in this condition. In twenty tests amongst fifteen diabetics, the writer found that the galactose excretions exceeded 3.0 g. in seven tests and 5.0 g. in three.* There was no recognizable liver disease in any of these cases, apart from changes which may be attributed to the diabetes itself. A case of diabetic coma in a child (Hosp. No. 6879-34) complicated by congenital hæmolytic jaundice is cited as an example of the disturbing effect of diabetes mellitus. In a test performed four weeks after complete recovery from the coma, 8.4 g. of galactose were found in the urine. One week later the excretion of galactose was normal. The large excretion noted previously could not be attributed to the hæmolytic jaundice, since the excretion of galactose in this condition has been found to be normal. In this case there were no clinical signs of liver injury other than enlargement, nor was any found at operation (splenectomy). Temporary impairment of galactose tolerance due to temporary but marked fatty infiltration of the liver, a common finding in diabetic acidosis in children, is suggested as the cause. The metabolism of galactose in diabetes mellitus is not as yet understood and further studies are in progress. Our experiences with the test to date indicate that until more is known of the metabolism of galactose in diabetes the test should not be used as an aid to the diagnosis of jaundice in this condition.

* In all tests urinary galactose was determined after removal of any glucose present by fermentation by yeast. Determinations were controlled by experiments in which added glucose was completely removed and the loss of added galactose was negligible (10 per cent or less).

SUMMARY

The principles and procedure of the galactose tolerance test and the interpretation of results are discussed. The interpretation suggested is based upon our experiences and previously reported data obtained under similar conditions. Attention is drawn to a number of conditions, other than liver damage, which may also impair galactose tolerance, and must be considered in the interpretation of tests.

The writer wishes to express his obligation to Miss Florinda Matheson and Miss Eunice MacDonald, who were responsible for the collection of urine and the nursing duties in connection with these tests.

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THE STUDY AND TREATMENT OF CANCER BY PROTEOLYTIC ENZYMES: A PRELIMINARY REPORT*

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PART I. EXPERIMENTAL

ANYONE who has been actively engaged in eye work will be aware of the rapid absorption of cataractous lens protein following the needling of congenital cataract. The varying and ultimate degree of absorption of these intraocular proteins in the adult is also a constant clinical finding. It was with a desire to know something of the biochemical factors concerned in this process that I undertook my research in the September of 1930. In the February number of the *Canadian Medical Association Journal,* 1934, I published an article which seemed to throw some light on these biochemical changes.

Hydrolysis of protein is carried out by active substances called enzymes, which act as catalysts. In the normal human body there are many enzymes. Those chiefly concerned with the hydrolysis of proteins foreign to the body are three in number, namely, leukoprotease, an active protein ferment associated with the polymorphonuclear leukocytes; lymphoprotease, contained in the large mononuclear lymphocytes; and globuloprotease, an enzyme which has been shown to be associated with the globulin fraction of the blood serum. It is a combination of the action of these three enzymes that is chiefly responsible for the process known as autolysis when this takes place *in vivo.*

Active extracts of these enzymes may be obtained and may be made to hydrolyse cataractous lens protein *in vitro.* A glycerine suspension of a mixture of these body enzymes was introduced into the lens in an attempt to hasten the absorption of cataractous lens protein in rabbits. Hydrolysis occurred very rapidly, but there was no control of the reaction. Invariably these eyes would go phthisic, or, in other words, there was no specificity, as all the intraocular structures were attacked.

At this point it became apparent that if any satisfactory results were to be obtained some source of enzyme possessing specificity must be found. The possibility of using the proteolytic microörganisms presented itself. After a careful and extensive examination of the literature I found that, although a considerable amount of work had been done, the present knowledge of the production and action of these enzymes was in a very confused state. It occurred to me that possibly the specificity might rest in the type of stimulation received by the microörganism. In other words that, if we grew these organisms on a medium containing one type or group of proteins, the living cell would secrete only the type of enzyme or enzymes necessary to break down these particular proteins. In the *Journal of Infectious Diseases,* (1919, **24**: 347), Diehl was able to prove that a degree of specificity of this nature existed.

After a considerable effort we found that we were able to procure a solution containing a specific type of enzyme, if we grew these organisms on a medium containing no other source of nitrogen except the insoluble lens protein which we wished to attack. We found that this enzyme solution would digest fresh insoluble lens protein *in vitro,* but would not digest gelatine or caseine. As a matter of convenience this solution was called "Ensol", from the first two syllables of the two words enzyme and solution.

Examining in a broad way our research at this point, it is easy to see why we applied this principle to the cancer problem. If we could do this with insoluble lens protein, why could we not do the same thing with foreign protein of any sort, provided that we could get the proteolytic microörganisms to grow on the protein we wished to attack?

We procured a piece of human scirrhous breast carcinoma tissue under sterile conditions, and, after removing from it all normal tissue as far as possible, put up sections in tubes containing 0.85 per cent NaCl. We inoculated each of these tubes with pure cultures of proteolytic

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microörganisms. We found that *B. histolyticus* in pure culture grew rapidly and that we had left in our tubes after four to six days incubation nothing but the fats of the tumour tissue and the fibrous tissue stroma of the growth. The actual cancer cells themselves had been digested by the enzymes secreted by *B. histolyticus*. The fluid in the tube contained a large proportion of the active enzyme. We filtered this fluid through a Berkefeld candle and obtained a sterile filtrate which when placed on fresh sterile carcinoma tissue showed much more rapid lysis of the cancer cells than took place in control tubes undergoing sterile autolysis.

Here then we had a sterile fluid containing an active substance which would cause lysis of the carcinoma cells. Could it be possible that we had found an antibody or active substance specific for the cells which had stimulated its production by the living *B. histolyticus*? If so, could it be used in the body without harmful effects and, finally, would it remain active in the blood stream or be neutralized by other body fluids?

In order to answer such questions, at least partially, some mouse experiments were undertaken with what appeared to be startling results. The "ensol" solution in this case was made from the mouse carcinoma tissue. Biopsies on these animal tumours before and after treatment by intramuscular injections of ensol showed the tumour cells in various degrees of destruction. The nuclei in many cells were powdered and the cytoplasm showed vacuolation, with increased fibrous tissue formation. Not being familiar with this type of investigation from the cytological point of view, I decided to place this work in more experienced hands. It has been referred to Dr. Murray, Director of the Imperial Cancer Research Institute, London, England.

During the progress of the animal experiments several cases of carcinoma were under my care with eye conditions. They had been pronounced incurable and sent home to die, after all forms of recognized modern treatment had been applied. These were given human carcinoma ensol intramuscularly. There was no inflammatory or other systemic reaction. These cases are reported in part two of this paper and are mentioned in the order in which they were taken on. The immediate effects were most remarkable and quite unlike anything previously observed. To verify and confirm these results I naturally sought other cases which could only be secured by announcing the discovery to my colleagues and soliciting their cooperation and assistance. This has been most generously rendered. As one would expect, the type of cases which we felt justified in treating were only those considered hopeless from the point of view of all recognized forms of treatment. In spite of this severe test the treatment has produced results which, we feel, confirm our earlier observations.

PART II. CLINICAL

Cancer Research carried on from the initial point of view as a search for the cause of the disease, or rather this group of diseases, seems, on the surface, to be a logical point of attack. Usually, if we know the cause we are in a favourable position for treatment.

In the August number of the *Canadian Medical Association Journal* of this year (p. 125) there appeared an article by Dr. James Ewing, Director of the Memorial Hospital of New York City, whose views on the cancer problem are widely accepted. Dr. Ewing concludes his article with the following sentence: "The secret of malignancy seems still to remain enshrouded in the obscurities of intracellular life, where it will probably long remain".

Let us think of the malignant cell as a biological unicellular unit and forget for the moment its various morphological characteristics. When the first malignant cell is formed in the body it must be looked upon at once as a living unit. It possesses life, and, along with this attribute, the urge to reproduce. In order that life may continue and reproduction take place its metabolic processes must be maintained. It is undoubtedly placed in favourable soil, and, much to the detriment of humanity, lives its prolific existence, finally exterminating its host. If we consider these factors of malignancy, we must concede that this abnormal body cell, no matter where it came from or of what chemical composition it is, can be looked upon as a parasitic microörganism. The only difference is in the cell's chemical composition.

With this established fact before us the problem of controlling malignancy may logically be approached in much the same way as some of the known successful methods of treating infectious diseases. The most successful of all attempts to control infectious diseases has been

the use of antidiphtheritic horse-serum. In this particular case we have been fortunate in finding a source of production of an antibody whose actual chemical composition is unknown.

The problem of cancer control then crystallizes itself into but two questions. First, where can we find a source of specific antibody against these proliferating abnormal body cells? Secondly, if we do, can it be used in the human body without harmful effects? When these two paramount problems have been satisfactorily solved most of us will agree that we have taken a very decisive step toward the control of this scourge.

PRODUCTION OF THE "ENSOL" SOLUTION

About 10 grm. of malignant tissue are removed at operation under sterile conditions, kept sterile, and dissected free from all normal tissue in the laboratory. The material is then placed in a large test tube containing 1 grm. of tissue to 10 c.c. of normal saline solution. The tube is then inoculated with pure culture of *B. histolyticus* and incubated at 37.5° C. under anærobic conditions for from four to six days, or until the fluid contents of the tube have settled out. When this has occurred the contents of the tube are centrifuged and the supernatant fluid filtered through a Berkefeld candle. Viability tests on this filtrate are done and if it is found sterile the enzyme solution is then ready to use.

A technical discussion of this fluid and its constituents is of biochemical interest only and should not rightly be included here. It is sufficient to say that this germ-free filtrate contains an active substance which seems to attack the tumour cells by which it was produced. Again it is only of biochemical and bacteriological interest to discuss the factors of lytic and synthetic processes which occur in these tubes. What is of vital interest is what happens in the cancer patient when such a solution is injected into the system. This will be best told by accurate case histories of a few of the earliest cases, taken in the order in which they presented themselves for treatment, as shown by their case number.

CASE 1

Mr. S.L., aged 49 years. Epidermoid carcinoma, proved by biopsy, originating in the left posterior nasopharynx and spreading to the frontal sinus, ethmoids, left antrum, anterior clinoid process and the frontal bone. Metastases had occurred in the cervical glands, but these had been treated with radium and surgery. The primary lesion had disappeared following deep radiation, but had recurred. The condition was of 1½ years' duration. While under observation this patient had been treated for syphilis, also for duodenal ulcer, requiring a gastro-enterostomy in 1934.

The case was referred as hopeless on May 10th, 1935. The patient complained of intense pain on the left side of the face and temple; marked bulging of the left eye; ptosis and loss of vision in the left eye (p. l. only); deafness in the left ear; marked cachexia.

Treatment with "ensol" was commenced on May 10, 1935. The dose was empirically set at 2 c.c., which at first caused some general malaise. After ten days' treatment the bulging eyelid showed some skin wrinkles. Vision was 20/100. Hearing in the ear had improved from C. V. 2 ft. to C. V. 18 ft. The patient became slightly upset and treatment was discontinued for a week. It was recommenced on May 28th. By June 7th the single daily dose had been increased to 4.5 c.c. He again became upset. When this upset cleared the dosage was changed to 0.5 – 1 c.c., alternating daily. On July 8th he had a typical bilious attack and treatment was discontinued entirely.

On September 7th the proptosis had completely disappeared. Except for a paralysis of the left levator palpebri, the left eye was as normal as the right. The pain had eased completely.

CASE 2

Mrs. E.M., aged 45 years. The left ovary was removed on August 7, 1934, and found to contain papillomatous cysts which had involved the peritoneum. She was treated extensively with deep radiation following the operation.

On February 14, 1935, she was admitted to hospital complaining of severe crampy pelvic pain, constipation, bladder irritation, general cachexia and loss of weight.

Exploratory operation showed that the pelvis was matted with growth which had bound down the lower small intestine. Section of the growth was reported on as "secondary columnar cell carcinoma".

After discharge she was sent home to die. Morphia, to grs. iv daily, was required to ease the pain. The bowels were very constipated and required enemata.

Treatment with ensol was commenced May 14th as an experiment. An empirical dose of 2 c.c. was given every third day.

The patient steadily gained in weight, the bowels became normal, the appetite good. Opiates were reduced to heroin, gr. 1/12, which has since been discontinued entirely.

On September 7th the patient appears a normal healthy individual. She is doing her own housework, going on picnics and swimming. No opiates are used; weight gain, 32 lbs. since May. The bowels are normal, no laxatives being necessary.

CASE 3

Mr. M.J.V., aged 40 years. Obstructing carcinoma of pylorus. Duration of symptoms 9 months. Diagnosed by x-ray and at operation, when a posterior gastro-enterostomy was performed. No biopsy was made, but surgeon's report reads "Scirrhous growth involving 3½ inches of the pyloric antrum, with evidence of peritoneal spread. Glands along lesser curvature extending down to cœliac axis. Liver appeared normal". The operation was on May 31, 1935.

The patient was referred on June 14th for treatment with ensol. He had no appetite, and cachexia was very marked. There was no pain. An x-ray plate, July 2, 1935, made for record, showed the stoma functioning well. Treatment continued until July 14th when the patient was allowed to go to Montreal on business. He returned on July 30th. At this date (September 7th) he is being carried on a small biweekly dose. His weight gain from June 14th is 18½ lbs. His colour is

clear and fresh. Appetite is good. X-ray report of the examination on July 2nd shows the stoma to be working well. The pylorus could not be filled. X-ray examination, August 10, 1935; stoma working well. The pylorus at the screening was filled in part; the stomach was also emptying through the pylorus. X-ray examination, September 7, 1935; stomach shadow was larger in area than at last examination; not emptying through pylorus. The stoma was functioning well.

CASE 4

Mr. R.H., aged 60 years. Epithelioma, proved by biopsy, of the inside of the right cheek, with secondary masses in the cheek and neck. The growth began as a small ulcer in June, 1932. Extensive treatment with radium and deep radiation was given.

He was referred as hopeless on July 2, 1935. On examination there was an ulcerated area on the buccal surface of the cheek and lower alveolar margin down to the bare bone. The ulcer had a raised, rolled beaded edge. The skin of the cheek was puckered in an area corresponding to the location of the ulcer. A hard indurated mass extended up the cheek to within 1 inch of the line of the external auditory canal and canthus, and down the neck to a point half way between the angle of the jaw and the clavicle, and spreading up behind the ear. The swelling was localized to the right side of the mid-line.

The patient complained of post-auricular pain and deafness in the right ear; intense pain in the buccal ulcer; inability to open his mouth because of the mass. His general condition was poor. He was using codeine freely for pain.

Treatment with ensol was commenced on July 3rd. The first change noticed was cessation of the post-auricular pain and improved hearing after the second treatment. Softening of the growth first began in the upper margin and then in the post-auricular mass. An œdema occurred in the right eyelid and on the right half of the lower lip. By July 30th the whole growth had softened. The upper margin had receded so that the upper alveolar border could be felt. The ulcer edges were sloping. The œdema was still present in the two areas.

Treatment was discontinued on July 30th. On August 3rd a small fistula opened on the site of the original lesion and his pain completely disappeared. For over a week he improved and the growth became almost fluid. Large veins began to appear at the posterior margin.

About August 12th it became apparent that secondary infection was present in the mouth. On August 21st he had recurrent severe hæmorrhages from the external maxillary artery and died.

CASE 5

Miss M.H., aged 67 years. Skin recurrence of scirrhous carcinoma in the incision after operation on the left breast, 1933. Two nodules and a large mass appeared in the autumn of 1934. These were treated by radium in February, 1935. The nodules disappeared. The large mass decreased in size but began to grow again. Also one of the small nodules recurred.

Referred on July 2nd. Biopsy for proof and a small portion removed for autogenous ensol. At this date the main mass was deep red in colour, lobulated, with some undercut edges. Measurements: 6.0 cm. in length, 4.8 cm. in width, and 1.5 cm. at the highest point from the skin surface. It was fixed to the chest wall, of very hard consistency and bled easily.

Treatment with ensol was commenced on July 4th and continued until August 2nd, when treatment was discontinued in order to observe any further changes which might occur.

On September 7th the main mass measures 4.4 cm. in length, 3.9 cm. in width, and its height is 1.1 cm. above the chest wall. The edges are sloping and the epithelium has grown in over all the edges, preceded by well-defined blood vessels. The growth is now distinctly lobulated and each lobule is soft on palpation. The small nodule has diminished to approximately one-third of the original size. The growth is painless and can be moved easily over the chest wall.

CASE 6

Mrs. C.C., aged 70 years. Mixed cell sarcoma, proved by biopsy, over the right scapula extending into the axilla, with a second mass along the 9th, 10th, and 11th ribs in the posterior axillary fold.

The growth began in 1931. Extensive surgery. radium, and x-ray therapy have been used without lasting effect.

Referred on July 14th, when a biopsy was done for tissue to be used for producing autogenous ensol.

The main mass was fungating and was fixed tightly to the scapula. The second mass was ill defined, subcutaneous and hard as a rib. Pain was continuous over the mass, in the axilla and in the forearm. The patient was using opiates freely.

Treatment with ensol was commenced on July 15th. After ten days it was possible to ease the pain in all but the forearm. On July 29th the skin around the growth was irritated by a disinfecting solution and for a week no change in the pain was noticed. From August 5th to date the pain has been completely controlled. This is the first time since February, 1935, that the patient has been completely free from pain. She is taking no opiates at all.

Both growths show a marked change. The upper mass is puffy at the edges and can be moved slightly over the scapula. The lower mass has centred into a well-defined lump which is quite doughy. It also can be moved over the rib.

CASE 7

Mrs. A.R., aged 52 years. Carcinoma of the cervix with extension laterally; masses being palpable through the abdominal wall in the right iliac fossa and in the right lumbar region. The primary lesion was diagnosed one and a half years ago. Referred for treatment on July 15, 1935.

The patient was very cachectic. She suffered intense spasmodic pain. The masses in the abdomen were nodular, irregular in outline and extremely tender. There was extensive ulceration of posterior vaginal wall, but no fistula. Narcotics were being used freely for the relief of pain.

Treatment with ensol commenced on July 16, 1935. No improvement was noted up to July 27th and intravenous ensol was given. After four doses she felt slightly easier, but her general condition was so bad that treatment was discontinued. After ten days, during which she became no worse, the treatment was begun again and she began to respond. At present the pain can be fairly well controlled. The abdominal masses are still tender, but their outline is less nodular and the growths appear to be of softer consistency.

CASE 8

Mr. W.C., aged 80 years. Carcinoma of the pylorus of the stomach—diagnosed by clinical finding and x-ray, which showed a 24 hour retention. No exploratory operation could be done because of patient's poor general condition.

Referred for treatment on July 18th. The patient was vomiting three to four times daily; he had no appetite; was very weak; and had a constant dull sense of weight in the epigastrium.

Treatment with ensol was commenced July 20th. After one week it was noticed that the patient was not vomiting and was eating small but normal meals. As his memory was vague, no optimum dose could be ascertained and after ten days' cumulative dosage he had a gastric upset. Treatment was discontinued for three

days. He has improved slightly since, but has periodic upsets about once a week.

CASE 9

Mrs. E.G., aged 39 years. An ulcerating scirrhous carcinoma of the right breast, proved by biopsy, serpiginous in outline, 6 by 5 inches at the longest and widest points and extending down so that the pectoral muscles were visible in the base. Five small outlying ulcers up to 1 inch in circumference. Secondary metastases in the bones and a pathological fracture of the left hip. The right arm was œdematous down to the finger tips. Duration of the ulcer, 8 months; of the original tumour, one year.

Referred for treatment on July 21, 1935.

Her general condition was poor, she appeared toxic and had pyrexia.

Treatment with ensol was commenced on July 21, 1935. The œdema in the arm showed the first change after the third dose. On July 28th the two larger secondary ulcers were dry and scaly. On July 30th the patient had an attack of acute gastritis, which was caused by overeating, as she had been feeling so much better. For three days, only liquids could be retained and the toxæmia increased. Treatment was discontinued. On August 4th she was improved but still toxic. On August 8th she died suddenly at breakfast. No autopsy could be obtained, but sections of the breast tissue were made.

CASE 10

Mrs. M., aged 61 years. Secondary carcinoma (proved at original operation) in both lungs, with osteoplastic and osteolytic changes in the upper lumbar vertebræ and suggestive changes in both hip bones and femurs. The original growth was in the left breast. Radical mastectomy in March, 1932, followed by routine deep radiation. She reported for treatment on July 21, 1935.

The patient was markedly breathless, even when at rest and had to be propped up in bed. On auscultation, there were marked changes in both lungs and fluid in both bases. This was later confirmed by x-ray. The heart was relatively normal. Her general condition was fair.

Treatment with ensol was commenced on July 22, 1935. By the end of the first week the breathing had improved, so that patient could be comfortable when at rest. Improvement continued slowly until July 31st, when, after treatment, she had a sensation in the left chest and coughed up some dark phlegm. From this point on improvement was marked. On August 8th she was allowed to leave hospital and receive treatment as an out-patient. Breathlessness is apparent now only on exertion. She is taking gentle exercise and her general condition is improving.

The following twenty cases are briefly summarized.

CASE 11

Mrs. L.W., aged 51 years. Carcinoma of the rectum; colostomy performed in 1931. She was fairly well until March, 1935, when a series of hæmorrhages occurred. Since then she has been going gradually down hill.

Treatment with ensol was commenced on July 22nd. After five weeks' treatment her general condition has definitely improved and the rectal pain has eased.

CASE 12

Mr. A.C., aged 57 years. A colloid carcinoma of ascending colon. An ileo-transverse colostomy was performed in June, 1935. This relieved the pain and obstructive symptoms but his general condition did not improve.

Treatment with ensol was commenced on July 24th. After six weeks' treatment the man has gained 18 lbs. and has returned to part-time work.

CASE 13

Mrs. A.H., aged 51 years. A malignant ulcer on the chest wall. The history began seven years ago. Both breasts have been removed. A recurrence in November, 1934, ulcerated and is now 8½ by 5 inches at the widest points, with a typical rolled, raised, beaded edge. A mass of glands in the right supraclavicular region had involved the plexus, causing constant pain in the right arm.

Treatment was commenced on July 26th. On September 7th the ulcer edges are flattened, the sides sloping and the base shows fresh granulation tissue. The arm pain is slightly relieved.

CASE 14

Miss G.B., aged 56 years. Secondary metastases from an original scirrhous growth in the right breast, in the head of the 8th rib and in the body of the 7th dorsal vertebra. The spine was markedly angulated and she complained of constant pain, but there was no paralysis.

Treatment with ensol was commenced on July 28th. The pain was controlled by August 7th. On August 29th the patient went home for a rest. The pain has not returned to date.

CASE 15

Mr. F.C., aged 63 years. A mass in the bowel at the pelvi-rectal junction, adherent to the right side of the sacrum. Main complaints, pain over the sacrum and small thready stools. Cachexia is marked.

The case was diagnosed on July 25, 1935 and treatment with ensol commenced on July 27th. The treatment continued to September 4th. The pain over the sacrum has lessened. The stools are larger and his colour is good. Appetite is fair and the weight has remained stationary.

CASE 16

Mr. F.D., aged 43 years. A periosteal sarcoma of the right femur. Diagnosed and treated with deep therapy in May, 1935.

Treatment with ensol was commenced on July 27th. At that date the largest circumference was 23¼ inches. After fourteen days' treatment the area was much less tense, but from that time on, no appreciable change has occurred. The latest measurement is 23 inches.

CASE 17

Mrs. D., aged 58 years. An original carcinoma of the cervix which had spread to the trigone of the bladder. Radiation had apparently checked the spread, but the patient was left with a vesico-vaginal fistula and some rectal ulceration. There was three hour control of urine in the vagina.

Treatment with ensol was commenced on July 25th and continued to August 11th. No change was noticed in the patient's condition at the time of her discharge.

CASE 18

Mr. T.W., aged 57 years. Primary carcinoma of the upper left lung. He complained of extreme weakness and dyspnœa and had lost over 100 lbs. in weight.

Treatment with ensol was commenced July 26th and continued to September 4th, when the patient was rested. He now has no effort in breathing; he is driving his own car and taking moderate exercise; his appetite is good and his weight is increasing.

CASE 19

Mr. N.Z., aged 35 years. Scirrhous carcinoma of the pylorus. A posterior gastro-enterostomy was performed in January, 1935. The patient improved until July 1st, when vomiting returned. When he reported on July 20th he was completely obstructed, but his general condition was too poor to permit of surgical intervention. After six days' intravenous treatment to combat dehydration, he was given ensol treatment until August 5th, when his general condition had improved enough to permit a laparotomy. The whole stomach, including the stoma, was involved by the growth. The patient died on August 13th. Portions of the growth obtained for microscopic study.

CASE 20

Mr. J.B., aged 76 years. Clinical evidence of carcinoma of the stomach. X-ray examination showed a filling defect at the pylorus and 75 per cent retention of barium. He complained of constant dull pain in the epigastrium, vomiting, anorexia and increasing weakness.

Treatment with ensol was commenced on July 29th.

On September 7th he was moderately improved. No vomiting; the pain had subsided; his appetite was fair, but the weakness had not improved.

CASE 21

Mr. H.C., aged 65 years. Recurrence from carcinoma of prostate. Prostatectomy was performed in 1934. Recurrences in the site and in the abdominal incision. His general condition was very poor. Blood urea, 113 mg. The prostatic urethra was blocked by growth and a retention catheter was necessary.

Treatment with ensol was commenced on July 29th and continued until September 6th. His general condition is only fair. The catheter was discarded on August 28th. Pain over the bladder is still present.

CASE 22

Mr. B.F., aged 57 years. An adeno-carcinoma at the sigmoid. A colostomy was performed in April, 1935. The patient improved after operation but had had difficulty in keeping his bowels open and reported several attacks of jaundice.

Treatment with ensol was commenced on July 28th. On August 21st he reported a considerable amount of reddish discharge per rectum and two days later a large amount of "fleshy" material coming away. This continued for one week.

On September 7th, he was fairly comfortable. The discharge had ceased, but he complained of some constant pain in the rectum.

CASE 23

Mr. G.F., aged 62 years. A lympho-sarcoma in the right groin and secondaries in the left inguinal region.

Treatment with ensol was commenced on July 26th. In spite of comparatively heavy doses, both intramuscularly and intravenously, there has been no decrease in the size of the growth.

CASE 24

Mrs. C.S., aged 46 years. Carcinoma of the cervix with extension to the bladder and rectum. Her main complaints were pain associated with the bladder and pain in the back and hips.

Treatment with ensol was commenced on July 28th. By September 1st the pain in the back and hips had been relieved, but the bladder pain was unchanged.

CASE 25

Mrs. F.L., aged 31 years. On investigation, she proved to have a simple chronic mastitis.

CASE 26

Mrs. R.S., aged 42 years. Bone metastases from a scirrhous carcinoma of the left breast. The pelvic girdle and lower lumbar vertebræ were involved and there was a pathological fracture in the left hip.

Treatment with ensol was commenced on July 29th. By August 14th pain was well controlled and extension was applied to straighten the left leg. On August 19th x-ray examination showed that there was no evidence of further bone involvement.

CASE 27

Mrs. G.B., aged 40 years. Secondary metastases in both lungs from an original scirrhous carcinoma of the right breast. In June she had a collapse of the right lung and since that date complained of cough, chest pain, dyspnœa and weakness.

Treatment with ensol was commenced on July 31st. By August 7th the breathing had improved slightly. By September 1st she was able to take moderate exercise without dyspnœa. The pain in the chest was gone and her general condition was moderately improved.

CASE 28

Mr. S.C., aged 57 years. A post-cricoid carcinoma of the œsophagus. When he reported for treatment he was only able to swallow liquids and his weight was 116 lbs.

Treatment with ensol was commenced on July 31st. His swallowing began to improve after the first week and in two weeks had definitely improved. He had gained 6 lbs. in weight. By September 1st, he was able to swallow solids when chewed carefully.

CASE 29

Mrs. L.G., aged 57 years. Carcinoma of the cervix, extension to the bladder and rectum and metastases in the pelvic girdle. She complained of severe pelvic and bladder pain, with pains in the back and hips. Her general condition was poor.

Treatment with ensol was commenced on July 31st. She has shown some improvement in her general condition and at times improvement in the pelvic and back pains, but on the whole has not responded to treatment.

CASE 30

Mr. A.M., aged 33 years. Secondary metastases of sarcoma, involving the lower four left lumbar nerve roots and the vertebræ. On admission the patient was suffering intense pain over these roots and down the left leg. Large doses of morphia were required and on occasions chloroform inhalations and nembutal, intravenously, were necessary to control the pain.

Treatment was commenced on July 30th but had no effect. The patient died on September 1st.

SUMMARY

Because of the very nature of this preliminary report it is impossible to discuss our clinical findings on a thoroughly scientific basis.

The cases have been treated and studied purely from the clinical point of view. Detailed biochemical examinations of the body fluids are being undertaken. Cytological studies of the cancer cells, comparing biopsy specimens before and after treatment, are being made and will be subsequently reported.

The solution has been used both intramuscularly and intravenously without any ill effects. Since but very little inert protein is present it

produces no protein shock. We have experienced no allergic reactions. The solution as a rule gives a negative biuret reaction, but always a positive xanthoproteic test.

The dosage is essentially individual. When pain is the predominating symptom the reaction dose produces a distinct increase in pain, commencing from one and a half to three hours after the intramuscular injection and lasting up to 24 hours, followed by complete disappearance. When pain is not a feature of the case the reaction dose produces a "picking", or "pulling", sensation in the growth for the same period of time.

Most cases seem to respond after ten to fourteen days' treatment. In the group of cases at present under observation the effects are consistently good. There has been a marked gain in weight, with disappearance of severe cachexia. Visible growths have shown arrest, with softening and absorption. In the cases where pain has been a prominent symptom the sedatives have been cut in half and in many cases discontinued.

In the internal growths a similar process is apparently going on, since a great deal of clinical improvement has been noted.

It is altogether too soon to assess the ultimate value of the method. Weeks to months must elapse before we can determine if the cancer masses continue to show shrinkage and absorption till their complete disappearance. Clinical evidence so far leads us to think that such disappearance may occur.

Steps have been taken to prevent the exploitation of the public and the profession by unauthorized interests. Consequently, no supply of this solution will be made available until its value has been definitely proved.

The manufacture and therapeutic use of this enzyme solution is comparatively simple, when thoroughly understood. We can be responsible for no results obtained by investigators who have not had special training.

Much of the credit of carrying this work into the clinical field has been due to the energetic efforts of my esteemed associates, Dr. C. D. T. Mundell; Dr. W. A. Jones; Dr. Charles Elliott; Dr. John Tweddell; Dr. John Delahaye; Dr. Fred Bonnell; Dr. I. Sutton and Dr. W. A. Campbell.

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For long and tedious laboratory assistance throughout the course of this investigation, I feel that a great deal of its success is due to the devoted service rendered by my technician, Mr. Bertram Holsgrove.

There are many others, too numerous to mention, who have given kind cooperation and assistance when it was most needed. To all these I extend my most sincere appreciation.

PLEURAL SHOCK*

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THE term "pleural shock" has come to include a variety of symptoms, most of which are both sudden and alarming, occurring in connection with operations on the chest. A few fatalities are recorded. As early as 1850, Chabaud[5] referred to "nervous accidents" occurring when the pleura or lung or both were operated upon. Certain writers seeking a more descriptive term characterized the symptoms as those of "pleural syncope", or "pleural eclampsia", or "pleural epilepsy", while Italian writers still speak of "epileptiform and apoplectiform seizures of pulmonary origin". It would seem that those who made use of these terms regarded a pleural injury or stimulus as the origin of the subsequent phenomena described in such cases. The use of the term "pleural shock" may be regarded as inapplicable in view of the most up-to-date teaching in this connection. Based upon experiments and clinical observations "air embolism" is held to be more descriptive, and many regard this as the term of choice.

CASE 1

The patient, a girl of 10½ years, was thought to have pus in the pleura or lung following an attack of lobar pneumonia on the right side, from which she was tardily recovering. Exploratory thoracentesis was done on the morning of February 23, 1907. The first puncture with a medium-sized exploratory needle was made in the post-axillary line between the fourth and fifth ribs, the needle being directed upward toward the region affected, as indicated by physical signs and

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skiagram. The operation, done under ethyl chloride spray, was well borne. It yielded a negative result. A few minutes later a second puncture was made in the anterior axillary line between the same ribs, the needle again directed upward. As no fluid was found, the needle was immediately withdrawn without manipulation. No unusual anxiety or suffering was manifest during these two punctures. Immediately on withdrawing the needle however a peculiar respiratory sound was heard, the head was suddenly drawn forcefully back, the whole body became rigid, the teeth firmly closed, the sphincters of the bladder relaxed, the face became cyanosed, and the skin over the body and extremities was marbled with areas of white and dusky red. The patient seemed unconscious. The pulse could not be felt; respiration was suspended. The head was strongly retracted and the mouth closed. The rigidity was followed by clonic spasms. The mottling of the skin gradually gave way to a uniform dusky pallor and consciousness returned within an hour. Promptly with the setting in of these most alarming symptoms the foot of the bed was elevated. Artificial respiration was begun and strychnine given hypodermically. It was impossible to adopt tongue traction as the mouth could not be forced open without breaking the teeth. On recovering consciousness the patient became excitable, restless, crying, and complaining of headache, especially after the attacks of vomiting which recurred at intervals during the first afternoon. At six o'clock she complained of being unable to see; the pupils were dilated and inactive. Shortly after midnight convulsive seizures set in and recurred until 4 a.m. They began usually in the left arm, and sometimes in the left side of the face, spreading to the left leg and then became general. They usually ended as they began, but the right side of the face or the right arm was sometimes in spasm after the spasm in the muscles on the left had ceased. The seizures lasting from twenty seconds to two minutes recurred at intervals of two or three minutes to twenty minutes. The time between the spasms lengthened with succeeding attacks, and after the thirtieth convulsion was over at 4 a.m. she remained very quiet and apparently comatose until 11 a.m., February 24th. When she awoke about noon she was somewhat irrational, but this state gradually disappeared. It was noticed, however, that there was a definite paresis of the left arm and leg. She was very irritable and resented being disturbed by examination or questioning. On the 25th and 26th she admitted that she saw but indistinctly. There were gradual signs of improvement. On the 28th the patient seemed again quite normal, eating and sleeping and taking an interest once more in the activities about the ward.

The pulmonary condition improved, the dullness cleared up, and within three weeks the patient was discharged quite well again, and has remained so.

CASE 2

An adult, with metapneumonic empyema on the right side, was operated on early in May, a rib resection being done. Drainage proved satisfactory, aided by a rubber tube, the length and size of which were changed from time to time throughout the course of the next four or five weeks. Pleural lavage was also done, Dakin's fluid being occasionally used. The capacity of the cavity was measured by the use of warm saline solutions on several occasions. Early on the morning of June 16th the dressing was found displaced and the drainage tube in the bed. In attempting to replace the tube the house surgeon experienced some difficulty as the tract had narrowed considerably. The manipulation caused the patient little or no discomfort. Very early however in the attempt, the patient's head turned to the left, the left hand, forearm and arm were thrown into clonic spasms, a peculiar sensation with twitching involved the left side of the mouth and face, the left lower extremity showed the same movements, and in a few minutes the spasms overflowed to the right side, where they were less pronounced. There was but slight if any mental confusion and no loss of consciousness. When the spasms ceased the whole left side was relaxed and weak, showing a hemiparesis of but brief duration. The time occupied was from five to seven minutes. The seizure terminated without any great sense of exhaustion. No further attempt was made to replace the tube. Convalescence was altogether satisfactory. It is interesting to remember that during the illness there had been frequent manipulations in the patient's chest — two or three exploratory diagnostic punctures; the drainage tube was in and out several times; pleural lavage and capacity measurements on three or four occasions; and only when convalescence was well established did the crisis or seizure which we have chosen to classify as "pleural shock" occur.

The characteristics of the so-called shock or crisis, both as to onset and course as well as termination, are fairly well set forth in the two case reports which have been reviewed above. They show how varied are the signs indicative of disturbances in the nervous system. In the first case you will recall the sudden retraction of the head, the rigidity of the whole body, the firmly closed teeth, the relaxation of the bladder sphincter, vomiting, the changes in the colour of the skin, unconsciousness, recurring convulsions, headache, blindness and hemiparesis; in the second case, local convulsive spasms in the left hand, spreading quickly over the left side and overflowing to the right side, leaving the left side slightly paretic; a brief duration with complete recovery. In other cases faintness alone may follow manipulation in and about the pleura and lungs. Again, fatal syncope may be as swift as the onset described in our first case. On the other hand, death may follow a few hours or days or even weeks of disability. Then, again, cardio-respiratory disturbances may be seen early, to be followed by more definite symptoms clearly referable to the nervous system. We have noted in other cases sudden cough with bloody sputum followed by the copious expectoration characteristic of pulmonary œdema. It may be recalled here as an historic observation that "albuminoid expectoration" followed by death in certain instances early in the practice of thoracentesis turned many practitioners against that operation, which was then regarded as more dangerous than the condition which it was designed to relieve.

Time of the seizure or crisis.—On this point there is a variety of opinion. Some maintain that the first puncture is the occasion of the

largest number of such accidents, while Chabaud believed that only a very small proportion occurred at that time. There is occasionally a local or premonitory warning before alarming symptoms set in; generally, striking pallor of the face may supervene almost instantly with the entrance of the needle into the pleura. Again, as in our first case, the seizure occurred immediately on withdrawing the needle after the second puncture. On other occasions the crisis may not supervene for several minutes, or possibly an hour, or even longer. Some operators maintain that exploratory punctures are most likely to be followed by this complication, as for example, those made after an attack of pneumonia to determine the presence of fluid or the type of fluid present in the chest. Lavage of the pleura was also regarded as a procedure dangerous to the patient for the same reason. We find in the literature emphasis laid upon avoiding puncture of the lung as well as on great care to secure local pleural anæsthesia. When the puncture is made in the right axillary region the reflex is more likely to be manifest than when another area is chosen. Vagotonic and highly emotional subjects are by some regarded as those susceptible to these accidents. In the two cases cited above the conditions differed widely. We may regard the first as illustrating the crisis at the first puncture (though it really occurred after the withdrawal of the second needle). In our second case the pleura had already been invaded many times. There are numerous instances corresponding to our second case as to time. For example, in the refilling of pneumothorax patients, even after many refills, the accident has been reported, while subsequent operations upon the patient have been quite uneventful.

The frequency with which we may anticipate this accident and the percentage of mortality require a much larger number of cases than we have available for this reckoning. However, after adding together the cases of a large group of operators in several centres, we have the following general statement to make. In 47,992 punctures, the majority of which were for the induction of pneumothorax, 124 accidents occurred, 12 of which proved fatal. The statement may be made as follows:—

	Accidents			*Deaths*
Stivelman	10	1 in	162	initial operations for pneumothorax.
Stivelman	2	– in	1,824	refills.
Saugman	16	– in	5,400	pleural entries.
Sachs	22	– in	1,122	pneumothorax operations.
Floriani	12	– in	134	pneumothorax operations.
Matz	18	– in	588	pneumothorax operations.
Bruns	16	7 in	12,700	punctures.
Reyer and Kohl[9]	10	2 in	3,500	insufflations over 4 years.
Andrews[1]	6	2 in	8,528	punctures.
Total	112	12 in	34,060	operations.
Boroch and Widré[2]	12	– in	13,932	refillings (890 patients)
Total	124	12 in	47,992	

The rate of mortality among those who are so disturbed is about 10 per cent. This record shows that one may expect a crisis or shock in about 385 punctures. Figures much larger than these and concerned only with pneumothorax therapy happily show that the accident occurs but rarely; as, for instance, in 229,000 insufflations reported by Frommel and Demole,[7] where only 63 were recorded, it occurred once in 3,635 punctures. The mortality however in their report is about 10 per cent.

Cause, or the mechanism.—As we have already remarked, "pleural shock" was taken as descriptive of the symptoms resulting from a certain implied mechanics. As not a few of these accidents occurred during exploratory puncture, where pus was suspected in the pleural cavity or in the lung, it was thought that stimuli would be much more likely to arise when an irritable or inflamed tissue was invaded. This idea was suggested many years ago by Brodie and Russell, and recently referred to by Capps and Lewis.[4] It was argued that injury of inflamed nerves is more likely to be followed by a reflex than injury of a normal nerve. We know that with inflammation (dry) of the pleura cough and reflex are present; with intestinal worms convulsions occur in the young; with nasal polypi there is often dyspnœa, and so on; that the sudden relief of tension accompanying the evacuation of large effusions or distending ascites is followed by faintness, occasional collapse, and even fatal syncope, all more or less accounted for by a *reflex action* altering the circulation and, more especially, the cerebral circulation. In certain of the cases mentioned above, spasticity and clonic muscular activity have been reported. Marked skin changes as well have been described, as pallor, mottling, of

dusky red and chalk white areas side by side, as seen in our first case. As the number of "pleural shock" cases increased, fatalities occurred and focal signs were noted—the Babinski reflex was present, weeks of monoplegia, hemiplegia, and days of blindness, which the reflex theory could not satisfactorily explain. These observations led clinicians and pathologists alike to look for other causes. Investigations with the hope of finding evidence that a thrombus dislodged from a pulmonary vein during the pleuro-pulmonary manipulations incidental to puncture, insertion of a drainage tube, or during pleural lavage, did not afford an answer. In 1912, Brandes[3] reported a death within twenty hours after bismuth paste was injected into an empyema sinus. The bismuth was found at autopsy within the smallest vessels of the cerebral cortex of both hemispheres (quoted by Schlaepfer). By animal experiments with injections of air about this date similar symptoms were induced, and air emboli were demonstrated ophthalmoscopically in the retinal vessels of animals operated on. The reflex theory was thus severely tested. In 1922 Schlaepfer[10] stated "that from the irritation of the normal pleura of different animals, mechanical, chemical or by the electric current we do not get a constant specific reaction by way of the central nervous system as we should expect if the so-called pleural reflexes were the real source" of these crises or accidents.

The theory of dislodged thrombi as well as the theory of pleural reflex were adversely criticized. The more reasonable view that air embolism explains many of these cases now generally obtains. Occasionally bismuth emboli, as already cited, have been discovered, and, more recently, fat emboli in the brain of a patient in whom oleothorax had been induced. Proof of vascular (venous) injury is not lacking in many of the cases exhibiting these nervous phenomena, thus affording an opening for the entrance of air or other substances which may be rapidly borne by the blood stream to the capillaries throughout the general circulation, thus temporarily or otherwise altering the nutrition and the function of the nerve centres. In small quantity a mere bubble, or several bubbles, may block a capillary; the nutrition of the centre supplied suffers, the air is absorbed, circulation is restored, and the function of the cell is again normal. Should the quantity be large and absorption slow, hæmorrhages occur and permanent damage may result in the area involved.

When the case is stated for and against the two theories, recently ably discussed by Cocke,[6] it would seem difficult indeed to make all the symptoms and signs fit either theory, or, to put it otherwise, it is difficult to explain all such accidents by air embolism or by reflex pleural shock. The light cases may show either pallor, nausea, vomiting, even with rigidity or clonicity. Focal signs, whether transient or permanent, suggest and almost certainly warrant the adoption of the embolism theory. The swiftly fatal cases present the same difficulty — a sudden lowering of the cerebral blood pressure, with or without convulsions, may so exhaust the respiratory centre (in those the majority of whom have doubtless had much cough) and weaken the action of the heart, whose function is already impaired by toxæmia, that a fatal syncope results. Or, according to the view clearly expressed by Dr. Meakins, on pleural puncture a spasm of the finer pulmonary vessels occurs, leading to a rapid rise in the pressure of the pulmonary circulation, and a great decrease in the volume of blood reaching the left heart, thus accounting for the rapid decline in the volume of the peripheral pulse and obvious cerebral anæmia with syncope and unconsciousness.

Prognosis.—The outcome in the large majority of these cases is altogether favourable, both as to life and disability. Working with several thousand operations, and having shown the anticipated frequency of the complication, we would point out again that the fatality percentage is higher than that of scarlet fever, or diphtheria, or even both these, ranking with that of many epidemics of typhoid fever—about 10 per cent. Higher numbers may serve to lower the mortality rate. The prognosis will depend, to some extent at least, on the strength of the heart forcing the blood through the capillaries as well as upon the amount of air which has entered the circulation. The region involved determines in large measure the outcome in serious cases, for if the emboli are lodged in the nutrient arteries of the respiratory centre or in the coronary arteries a fatal outcome is seriously threatened if not practically certain.

Treatment.—There are those who attribute their good fortune in having never met with a case to their careful procedure at the operation,

operating only in a well *anæsthetized pleura.* Another statement is to the effect that no crisis comes in the operation *if the visceral pleura is not injured,* as the impulse arises in that structure and is transmitted by the vagus. These two prophylactic measures seem applicable to true "pleural shock" cases, and to a large extent as well to the embolic theory as the lung cannot be pierced. Disregarding the mechanism accounting for accidents in pleural puncture, it seems a wise precaution to avoid diseased areas within the chest. In other words careful physical examination, including that by fluoroscopy, is strongly advised. Blunt-pointed needles are regarded as safer than sharp needles. Boroch and Widré[2] state that in no case with free pleuræ and negative terminal pressure was embolism experienced. It has been already noted above that Boroch and Widré have an enviable record of having made 13,935 punctures on 890 patients with but 12 accidents and no fatalities.

On any sign of a possible crisis, naturally, one ceases all operative activity. Withdraw the needle. Lower the head, and keep it low, if possible for an hour or so. Stimulate the heart by epinephrine or even massage (some advise this). Heat and strychnine may be helpful. If there is cessation of respiration, perform artificial respiration.

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CARCINOMA OF THE CERVIX*

(A REPORT ON 100 CASES TREATED AT THE MONTREAL GENERAL HOSPITAL, 1925-1929)

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THE cervix is one of the most frequent sites of primary carcinoma. Welch found in a series comprising 31,000 cases that the primary growth was in the stomach in 21 per cent, while 29 per cent of the lesions were in the uterine cervix.

Carcinoma of the cervix is distinguished from other malignant neoplasms by having a very constant and definite etiological factor in its histogenesis. It occurs almost exclusively in cervices that show erosions, lacerations or hypertrophy—lesions which are usually the result of child-birth. It is estimated that over 95 per cent of the women who suffer from carcinoma of the cervix have had one or more children. While malignancy rarely develops in scar tissue, cervical lacerations destroy the normal architecture, interfere with nutrition, and expose the more delicate columnar epithelium of the canal to chronic irritation and inflammation.

When these more or less common conditions are cared for, the incidence of malignancy is greatly reduced. In 2,895 cases of endocervicitis with erosion, Hunner found, in a ten year follow-up, that not a single patient had developed the dread disease. Add to this the fact that carcinoma of the cervix is less common in private than in dispensary patients, largely because they they receive better obstetrical and post-partum care, and the importance of good obstetrics, as well as the adequate treatment of such conditions as chronic catarrh of the cervix, is clearly evident. It is interesting to note that among Jewish women cervical cancer is very rare, since any discharge is considered "unclean" and is therefore cared for.

Another form of chronic cervical irritation is the small mucous polyp of the cervix, which,

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while usually benign, may develop malignant changes. Among 235 cases of carcinoma the growth had probably originated in 5 at the base of such a polyp. Hence such a polyp should not only be removed with care, but in every instance, be examined pathologically for changes in cells which would indicate early malignancy. This factor may explain many of the 5 per cent of cases which occur in non-parous women.

In addition to prophylaxis the next great need is early diagnosis. Unfortunately the patient seldom seeks advice early, for the symptoms in the initial stages are mild — pain is absent, discharge of some kind has usually been present for years, and patients have an inherent fear of cancer and believe it incurable. In the small ulcerating growth the only objective sign may be bleeding on coitus or after douching. Since many cases occur before the menopause, in comparatively young women who attach little significance to a brownish or blood-tinged discharge, it follows that only a very thorough gynæcological examination of every patient who presents herself, will enable us to detect incipient lesions.

If a history of daily, irregular bleeding or spotting, or of a brownish discharge is obtained, a careful bimanual examination and inspection of the cervix is done. In cases where one is suspicious of carcinoma, Schiller's iodine test may be tried. The entire cervix is thoroughly painted with Lugol's iodine. The superficial layers of the cervix and vagina contain large quantities of glycogen and therefore stain a deep mahogany brown, whereas when the superficial epithelium has been eroded or destroyed by carcinoma these staining properties are lost. Since the differential diagnosis usually lies between an early malignancy and an erosion much of the value of the test is lost. Unstained areas are not diagnostic of cancer, but do indicate points from which tissue should be removed for microscopic examination. To exclude carcinoma of the cervical canal a sterile sound may be introduced and manipulated over the entire cervical mucosa, as suggested by John G. Clarke. If a friable lesion is present, a trickle of blood will invariably be started.

Careful examination, including the use of the above-mentioned tests, sometimes gives conclusive evidence, but in the early case the final decision rests on examination by a pathologist of an excised piece of tissue. Trauma is an important factor in the dissemination of carcinoma, but one should not hesitate on this account, in a doubtful case, to excise a V-shaped piece of tissue from the suspicious area.

The importance of early diagnosis is shown by Norris who reports a five-year salvage of 85.8 per cent in 35 cases in which the primary growth did not exceed 0.5 cm. in diameter. In lesions limited to the cervix, Heyman reports 43.6 per cent free of recurrence in five years, whereas when the disease has spread beyond the cervix only 16 per cent were alive in five years.

Former methods of treatment, panhysterectomy, Percy cauterization of the growth, and ligation of the uterine arteries, have been abandoned in favour of radium. This is largely due to the fact that so many of the cases were too far advanced on admission for hysterectomy, and even in the early cases local recurrence was frequent within a few months after operation. Formerly many advanced cases were considered inoperable and hopeless, and were not, therefore, admitted to hospital. The number of admissions of these cases to the gynæcological ward of the Montreal General Hospital is nearly three times as great in the past ten years as in the ten years immediately preceding our use of radium. That is, many of the cases which formerly were turned away as hopeless are now admitted and treated, and a small percentage of these "hopeless" cases are numbered among our cures.

The cervix is one of the ideal sites for radium therapy, since both the factors necessary for efficient treatment are present. In the first place, the growth must be sensitive to the gamma ray. Practically all cervical carcinomas show undifferentiated, immature cells of class 3 or 4 according to Broder's classification, and these are the cells most sensitive to radium. Secondly, one must be able to place the tubes accurately all around the growth and to crossfire its line of probable spread. The anatomical arrangement of the uterine canal and the vaginal fornices permits of very careful application without undue radiation of any spot and of comparatively close proximity to both the visible lesion and its line of spread.

Since July, 1925, 235 patients with carcinoma of the cervix have been admitted and treated at the Montreal General Hospital. With two exceptions all these were treated with radium. One patient had a very early carcinoma, associ-

ated with a complete prolapse of the uterus, and a vaginal hysterectomy was done; the second patient had a submucous fibroid, and at operation a carcinoma high up in the cervical canal was accidentally found.

In the first four years, that is from July, 1925, to July, 1929, there were 103 cases, 2 of which were recurrences following hysterectomy done some time previously for carcinoma. The remaining 101, according to Schmidt's classification, were arranged as follows:

Stage 1, operable ..... 16 cases
Stage 2, border line..... 10 cases
Stage 3, inoperable ..... 34 cases
Stage 4, advanced inoperable..... 41 cases

i.e., about 75 per cent of the cases in this series belong to the inoperable and advanced classes. All cases admitted to hospital are included, and those patients whom it has been impossible to trace are listed as dead. The diagnosis has always been verified by pathological section.

The dosage of radium and the method of treatment has been varied slightly. In 1925-1927 the patients were given one radium treatment, which varied in strength from 2400 to 4500 mg. hours, and was divided into two treatments, ten days apart. In all, however, the principle has been the same, namely, to crossfire the growth and its line of spread from as many angles as possible. Therefore, radium is placed in the uterine and cervical canals against the cervical cancer itself and in the fornices. Various forms of applicators have been used—Clarke's T tube, straight tubes, the colpostat, silver boxes, etc., as they seemed to suit the individual case. Deep x-ray therapy was given some of the cases in which the fornices were involved and pain was present, but not as a routine treatment as it is today.

Of the 101 patients, 24, or 23.3 per cent, are alive and free of recurrence today. Twenty-six of these cases belong to the early and border-line groups, whereas 75 had advanced lesions.

Group	*No. of cases treated*	*No. alive and free of recurrence*	*Percentage alive*
1 and 2	26	13	50
3 and 4	75	11	14.6

The prognosis is influenced, therefore, by the extent of the growth, the general condition of the patient, and by her age. Patients under 35 years of age do badly. Whereas not all cases in Group 1, have done well, a much larger percentage of these patients are alive than of those in Groups 3 and 4.

Follow-up examinations were made every month during the first year, and less frequently, but regularly, in subsequent years. When a recurrence was noted either in the cervix or the vagina a further treatment with radium was given, but this was always smaller than the initial one. In three cases which showed local recurrence without any spread to the broad ligaments hysterectomy was undertaken, but the results did not seem as satisfactory as when radium was used. Such local recurrence usually appeared within the first year, whereas metastatic growths in the parametria often supervened after several years of apparent cure. The lateral recurrences were treated with roentgen rays, and in some cases there was not only relief from pain but also considerable reduction temporarily in the size of the mass. The end-results in this group were not good.

It would seem, therefore, that if patients received good obstetrical care, including the postpartum treatment of eroded and lacerated cervices, the incidence of carcinoma of the cervix would be greatly diminished. Further, if the importance of intermenstrual bleeding was recognized, and patients were subjected to careful examination at once the number of patients reporting early for treatment would be increased and the percentage of cases cured, greater.

DINITROPHENOL IN THE TREATMENT OF OBESITY.—M. L. Tainter, A. B. Stockton and W. C. Cutting, and their collaborators treated 170 unselected obese patients with sodium dinitrophenol (2-4), administered by mouth for an average of eighty-eight days each, in an average daily dose of 0.34 gm. The average increase in metabolic rate was about 11 per cent for each 0.1 gm. daily dose. The average loss of body weight was 17.1 pounds for each patient, with an average rate of loss of 1.4 pounds weekly. Patients resistant to dietary or thyroid measures lost weight as well as those previously untreated, but patients who had resisted combined dietary and thyroid therapy lost less rapidly on dinitrophenol than the other groups. The main symptoms of therapeutically effective doses of dinitrophenol were those of extra heat production; namely, sweating, flushed skin, concentrated urine, and sensations of warmth. These symptoms could be controlled to some extent by building up the dosage gradually to the therapeutic level and by ensuring adequate fluid intake. No evidence was obtained in these patients that dinitrophenol affected the blood cells, as shown by blood counts and clinical observations. Side actions, consisting of skin rashes or peripheral nerve changes, were observed in about one-fourth of the patients receiving high doses, or in about one-seventh of the entire series.—*J. Am. M. Ass.*, 1935, **105:** 332.

STOVARSOL (ACETARSONE) IN THE TREATMENT OF CONGENITAL SYPHILIS

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DURING the last few years a considerable amount of literature on the treatment of congenital syphilis by the oral administration of arsenic has appeared. The drug used is known as "stovarsol" in France, "acetarsone" in the U.S.A., "spirozid" in Germany, and is one of the series of arsenical compounds made by Ehrlich. Apparently it was discarded in favour of arsphenamine as there is no reference to its clinical or experimental use until 1921. In that year Fourneau reported the experimental results of stovarsol, and in 1922 the first reports appeared on its prophylactic and therapeutic effects in syphilis. In 1924, Dupérié, Cadenaule and Clarac[1] reported on the use of the drug for the treatment of congenital syphilis.

The feature of greatest appeal is of course the fact that the oral administration of the drug dispenses with the difficulty of painful injections in infants and small children. In the past, the physical discomfort of the treatment of congenital syphilis has frequently seriously interfered with the full cooperation of parents in the treatment of their children. The difficulty of medication in infants has tended to congregate children with congenital syphilis in special clinics. At the same time, on account of the difficulty in treatment, distance from specialized centres, or inexperience on the part of the family physician in intravenous medication, there is no doubt that many children did not receive adequate treatment.

DOSAGE

At first Tuscherer's[2] method was rather widely used. Under this régime, irrespective of the age of the patient or his weight, the following treatment was given:

¼ tablet once a day for three days.
¼ tablet twice a day for three days.
¼ tablet three times a day for three days.
¼ tablet four times a day for three days.
½ tablet three times a day for three days.
½ tablet four times a day for three days.
1 tablet twice a day for three days.
1 tablet three times a day for twenty days.
Total—84 tablets (21 gm.) in 41 days.
1 tablet—0.25 gm.

Later, Bratusch-Marrain[3] instituted a plan, based upon clinical and experimental work, of graduated doses in proportion to weight. As this seems to be much more rational and more easily controlled, it is now the one most widely adopted. By this means 5 mg. of the drug per kilo. of body weight are given daily for one week, followed by 10 mg. per kilo. the second week, 15 mg. per kilo. the third week, and 20 mg. per kilo. during the fourth week and up until the ninth week. This is followed by a six-weeks' rest period, and the course is then begun over again, irrespective of the serological reaction. The drug may be used alone or in courses alternating with mercury or bismuth. In general, however, it seems quite safe under careful supervision to continue with stovarsol alone, observing proper rest periods. Better absorption of the drug is obtained if it is administered a half hour before meals or feeding, in water or milk.

GENERAL RESULTS

Serological.—As with other methods the best results are obtained when treatment is begun early. A large number of those treated in early infancy undergo a reversal of the serological reactions with one course. Abt and Traisman[4] found that under the age of one year 71 per cent of the serological reactions were reversed by one course. From the ages of one to six, 65 per cent were reversed, and from six to twelve, 47 per cent. On the second course 50 per cent of those still remaining positive became negative. There has scarcely been time, in America at least, to observe fully the effect of stovarsol on the so-called Wassermann-fast cases. Some observers report that they have been successful with stovarsol in securing negative Wassermann tests, which were persistently positive under treatment with arsphenamine. It is possible, of course, that stovarsol may be more efficacious in the treatment of these Wassermann-fast cases, but one would be rather hesitant in expecting spectacular results.

Cerebrospinal fluid.—Horster, in 1931, working with mice, showed that stovarsol, if given early after intra-cerebral inoculation of *Spirochæta pallida,* will prevent the development of the disease, and if given later will cure existing cerebrospinal syphilis. The latter has been corroborated to a certain extent in clinical practice, and different observers have commented on the reversal of the serological reactions in the cerebrospinal fluid, when stovarsol is used. Among the cases treated in this clinic we observed a complete reversal of the Wassermann reaction and Kahn test in the cerebrospinal fluid of an infant who developed syphilitic meningitis while under active treatment with neoarsphenamine. The effect on those with signs of parenchymatous involvement has not been so encouraging, but appears to be as good as under other forms of treatment.

The bones. — It has been doubted whether stovarsol produces satisfactory results in the case of syphilitic osseous lesions. The experience of this clinic in the treatment of the osseous lesions with stovarsol has been entirely satisfactory. When pseudo-paralysis exists, the infant begins to move its arms in from a few days to a week; radiologically, improvement is rapid, and in within three to four months the bones may appear practically normal. Similar results are indicated by Friedman.[8]

Tonic effects. — In children with cutaneous lesions the rhagades and rash disappear very quickly, usually in from one to two weeks. Condylomata, however, may be more resistant. Snuffles disappear rapidly, usually showing considerable improvement at the end of a week. In most cases the general nutrition improves promptly. In older children it has been frequently observed that there is improvement in the appetite and general health.

Toxic manifestations. — Toxic reactions are about as frequent as with arsphenamine, but appear to be less severe. Diarrhœa and vomiting are two of the earliest symptoms of intolerance or intoxication. Febrile disturbances occur occasionally. Mild or moderate albuminuria may arise, either independently or in conjunction with other signs of intoxication. Arsenical dermatitis occasionally develops, but is not common. It was only met with once in our own clinic. Neuritis or myelitis are among the more serious hazards, and must be constantly watched for. Seven deaths occurring in children under treatment with stovarsol have been reported to date. These, while serious, are not to be regarded as too discouraging. They do, however, emphasize the necessity for caution in the administration of the drug, and in the supervision of the patients while under treatment.

The only advantage so far proved over previous forms of treatment is the ease of administration. This advantage usually promotes the cooperation of the parents which is so essential. While the drug is still in its probationary period of use it has usually been found that its judicious management produces satisfactory results.

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REACTIONS TO SUN-BATHING.—R. Clément (*Presse Méd.,* March 16, 1935, p. 430), describing the reactions which occur during sun-bathing, divides them etiologically into those due to the individual reaction of the patient and those due to the character of the rays. Certain chemical substances may sensitize the skin locally or generally. Among these are lipsticks, containing a fluorescent dye, and eau-de-Cologne, containing essence of bergamot, which act locally, while trional and sulphonal, by exciting the formation of hæmatoporphyrin in the body, produce a general sensitization, which occurs also in pellagra. It is suggested also that an anaphylactic type of sensitization may be produced by eating certain foods. The character of the rays varies with the time of year, the geographical situation, etc. Reactions due to alteration here are most commonly local, occurring on the parts normally exposed. They are protean in appearance, varying from a simple first degree burn or a mild conjunctivitis to epitheliomatosis, any of which lesions may become secondarily infected. General reactions—sun stroke or heat stroke—are probably due to a combined action of all the different wave-lengths. The fundamental pathological change seems to be a pronounced rise in the body temperature of the victim. In man, waves of all lengths will produce such a rise, as may be seen in the violent reactions to exposure to the sun in cold and snowy districts. The dangerous symptoms of a general reaction are suppression of sweating, frequency of micturition, extreme thirst, and fatigue. Besides general and local reactions there are the focal reactions in patients suffering from some chronic or recurrent disease, notably those seen in pulmonary tuberculosis.—Abs. in *Brit. M. J.*

DIETARY FACTORS IN HEALTH AND DISEASE*

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THE problem of the nutrition of the population has always been one of the most important in human affairs. The survival of a people has been dependent on the availability of food. Probably the great migrations have had as their principal motive the need for new sources of food. A rise in the scale of civilization has often been associated with the relative ease of its procurement. The accumulated wisdom of ages, based largely on trial and error, furnish the background for the present science of nutrition. We should not hesitate to use this accumulated wisdom, since, though imperfectly recorded, the influence of food on races, tribes, or peoples extending over centuries has been a vast series of experiments, with man himself as a subject. Man is omnivorous, meaning, in the broadest sense, that he will eat everything. He has eaten practically everything at one time or another, and selected that which he has considered good for him as his food. In earlier times he was limited in variety of food to the flora and fauna of the region he inhabited or to that which would grow in that area when introduced there. Climatic differences have played a part, not only conditioning the foods available but also their relative desirability as food for man in that region. The state of civilization of the people involved, their numbers, their place in time, their customs and racial taboos, have all conditioned their experiments. Only in comparatively recent times has man been able to escape from these limitations. We may learn from these experiments that certain diets have had a most deleterious effect on a people, while others have been much more happy. But, more important than this, we learn how wide is the range within which a diet may be varied and still be regarded as normal.

For the first time, we, on this continent, meet a mass experiment in nutrition of astonishing proportions, wherein some twenty-five millions of people are being cared for at the public expense. While they do not lack for food, as unfortunately has happened in the past, and is even now happening elsewhere, one may ask whether the nutrition is of the best. Continent-wide, doubtless the conditions vary somewhat, but the vast expenditures necessary make economy imperative. Is it a true economy? nutritionly sound? Much emphasis has been placed on the economy of carbohydrate calories as opposed to protein and fat calories, which are relatively expensive. Unemployment diets are tending to run high in carbohydrates. Excess carbohydrate often leads to obesity when given to people without work to use up the energy supplied. As Friedrich Müller puts it: "Obesity is capital; the interest is laziness." Despite the Eskimos, it is a well-known fact that the "beans" of the race is closely paralleled by the consumption of protein food, while carbohydrate eaters are distinguished by fatness and physical and mental apathy. The apparently inevitable degradation from unemployed to unemployable should not be accelerated by a falsely economical provision of foodstuffs.

It does not necessarily follow that the average diet consumed in a region is the optimum for a race for that region, or for particular individuals of that race, nor is the contrary of necessity true. But, given adequate opportunity, there is undoubtedly a tendency for the race to approximate a dietary most suitable for the unalterable conditions of its surroundings.

The normal diet for an individual varies a great deal according to the place in which he lives, its animal and vegetable life, the fertility of the soil, the climatic conditions, the available means of transportation, his age, his tastes, his material prosperity, and many other conditions, not least of which is public opinion in his district. To define the normal diet, then, in terms of foodstuffs, without consideration of many other factors, is quite as unsound as it would be to define it in terms of any other single factor. The normal diet must be considered as the out-

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come of all these factors, plus the common sense and experience of the race inhabiting the region. Food fads and fancies fail, not because they do not improve the health of the crank who is their protagonist but because they run counter to the dictates of everyday experience. Any dietary which departs in marked degree from that commonly in use among middle class people of the region must be labelled as suspicious and carefully scrutinized for possibilities of danger to the individual using it. In this scrutiny certain basic principles must obtain if any diet, whether for a normal individual or for the treatment of a pathological state, is to be permanently successful.

The first of these principles is the provision of an adequate supply of energy. The basal caloric requirement is that amount of energy required to keep the animal alive in the resting condition; the maintenance requirement includes the basal caloric requirement and the energy required for growth, muscle work and play, digestive activity, etc. The maintenance requirement for energy must be delicately adjusted and supplied according to need if the patient is to remain healthy.

Fiction writers have envisaged man of the future as all brain, with trunk and limbs to conform to their comparative uselessness. We have not as yet progressed that far, nevertheless it should be realized that this is the age of the machine and the older standards of energy requirement for various occupations are no longer applicable to modern conditions. Even in those occupations where considerable physical labour is still required a reduction in working time from ten to eight hours has taken place, and now with the six-hour day and five-day week in the offing, or actually in operation in some industries, our standards are considerably too high. A shrinkage of at least 800 calories a day is indicated for some occupations, depending in part on the use the individual makes of his leisure time.

While the basal caloric requirement for an individual can be closely approximated by the use of the Aub-Dubois or Harris-Benedict tables, an allowance of an additional 5 per cent made for specific dynamic action and 40 per cent for leisure hours not spent in sleeping, the energy expenditure for the working hours varies enormously, sometimes reaching ten times the basal level. Different individuals, because of conditions quite extraneous to the work itself, expend decidedly different amounts of energy in doing a certain piece of work. It is, therefore, impossible to calculate with any degree of accuracy a definite diet for a given kind of work. One can only make use of approximations of the crudest sort and in the long run adjust the intake to the requirements of the individual on the basis of his maintenance of physical fitness. Unscientific as this may seem to the theorist, the number and variety of the variables involved make it the only practical method when dealing with a single case. The food requirement of an army corps is much more easily approximated than that of an individual.

The requirements of the body are not met by the ingestion of a single foodstuff. The various necessary elements of a diet are classified into proteins, fats, carbohydrates, mineral substances, vitamins, water and non-nutrient substances. Of the last group I shall have little more to say, except to point out that these condiments, essential oils, alkaloids, and unassimilable residues, etc., play an important rôle in providing flavour, work for the teeth and muscles of mastication, serve to carry more directly useful foodstuffs, and provide bulk useful in stimulating intestinal peristalsis. These non-nutrient substances are perhaps not absolutely essential, since life can be supported without any of them, but at the cost of a distinct disadvantage to the individual. The other substances mentioned are, in certain amounts, indispensable for life.

Water is a solvent in which is dissolved, in true or colloidal solution, most of our actively living protoplasmic mass, other substances newly arriving in the tissues to be built up into protoplasm or to furnish energy, and, as well, the products of combustion in the tissues and on the way to excretion. Since there is a continuous loss of water by the skin, lungs, kidneys and bowel, the exceeding sensitivity of the tissues to variations in concentration of their constituents and also to waste products makes it necessary that an adequate supply of water be taken in order to produce an equable concentration of these substances in the body. Excessive quantities do no good and indeed may be distinctly harmful. No absolute rule may be laid down, since the requirements vary so greatly from time to time, but a total intake of less than two quarts per day is likely to be harmful if persisted in for a sufficiently long period. It

is often forgotten that total fluid intake includes the water content of the meats, vegetables, etc., as well as water produced by oxidation of the food.

Like water, inorganic substances do not undergo changes in composition for the purpose of liberating energy, but have the important function of providing a stable framework for the soft tissues and by their concentration and specific properties of influencing the amount and direction of metabolism in the body. While excessive amounts are usually present in the food, and, in health, are removed by the various avenues of excretion, an actual deficiency of certain elements, such as iron, calcium, phosphorus, and iodine in some regions, or in relation to certain bodily activities, such as growth, will induce profound physical and mental changes in the individual and perhaps in the race. Care must be taken that these valuable salts are obtained in sufficient quantity, in spite of our growing fondness for highly milled and elegantly prepared foods.

The carbohydrates and fats form a convenient, cheap and palatable source of energy. The variety of forms in which they are available removes the sense of monotony inseparable from large protein meals, and they have almost no specific dynamic action, that is, they do not, as protein does, accelerate the rate of metabolism and thereby impose excessive wear and tear on the organs of the body. A certain minimal amount of carbohydrate is indispensable, to burn the acetone bodies derived from the metabolizing fat, but there remains to be suited the palate of the individual, who will usually select a ration of three to eight times as much carbohydrate as fat.

Proteins have the additional function of replacing the breakdown of the body tissues in the process of metabolism. On the arrangements and proportions of the constituent amino acids depends the specific properties of the protein. It is, then, not only necessary that the individual have sufficient protein but that he have sufficient of the right kinds of protein. Proteins which most efficiently replace the proteins of the tissues are known as proteins of high biological value or Class A proteins. Meat, eggs, milk, cheese, fish and fowl belong in this class; while those foods of less suitable proportions of amino acids, such as some cereals, nuts, etc., are known as Class B proteins. Proteins entirely lacking in an essential amino acid, such as gelatin, zein, etc., are rated as Class C, and should never form a large proportion of the protein of the diet.

The excess of protein over actual replacement requirements may be used for growth, stored as fat, or used directly to furnish energy. When used for the two latter purposes it subjects the organs of the body to unnecessary work in digesting, assimilating, metabolizing and excreting the waste products, which are much more numerous than in the case of fats and carbohydrates. At the same time, it is probably unwise to restrict too severely the protein of the diet to the absolute replacement of tissue broken down unless the individual is known to be incapable of metabolizing it. The present tendency, however, is toward an adult protein allowance of 100 grams per day, in place of the older American and German standards of 120 to 130 grams for light work.

Several substances, known as vitamins, which are of the greatest importance to health, have been found in minute traces in food. Young and growing animals are most affected by an insufficient supply of these substances, some of which have actually been isolated and synthesized. Fat-soluble A, derived from carotene, is intimately related to growth. Its absence causes cessation of growth, xerophthalmia, and night blindness. Evidence that it functions as a general anti-infective agent is not altogether conclusive, while evidence is accumulating that excessive amounts of this vitamin are capable of producing bone and kidney lesions. It is found in milk, eggs, the animal fats, the liver, and leafy vegetables and grasses. Vitamin D — calciferol, irradiated ergosterol, the antirachitic vitamin—is also fat-soluble and has been definitely shown to be the most important single factor in the control of rickets and osteomalacia. Of the possibilities of danger from amounts slightly above the therapeutic level we know little at present. Considerable overdosage causes widespread damage to the vascular system. Its sources are the same as those of A. The third fat-soluble vitamin (E) is essential to reproduction, and is found in greatest concentration in the germ of cereals.

Of the water-soluble vitamins there are two principal groups, B and C. Vitamin C, recently identified as ascorbic or cevitamic acid, and the lack of which is responsible for scurvy, is

abundantly present in fresh fruits and vegetables. Vitamin B, the anti-neuritic, anti-beriberi, and anti-pellagric vitamin, is apparently a complex picture, B_1, B_2 (sometimes known as G), B_3 and B_6, which have been described and particular properties assigned. The relationship of these to each other, to the flavines, and to pellagra, is still uncertain. They are found most abundantly in fresh fruits, vegetables, cereals and yeast.

Deficiency of these substances, either alone or in combination with other factors, is responsible for certain diseases of adult life, but there is little evidence to support the view that the adult population as a whole, when living on a diet otherwise adequate, suffers from an insufficiency of vitamins. It is becoming more apparent that these substances as a class are not independently active therapeutically, but that the best results are attained by their use in combination with a nutritional scheme properly balanced in other directions as well. The harmonious action of numerous factors results in good nutrition. From the point of view of perspective, as well as of history, it may well be remembered that Hopkins originally called the vitamins *accessory* factors.

These, in brief, then are the constituents of a normal diet. Though it has been previously stated that the normal diet of regions is determined by many factors and is a product of experience of the race, the latter factor is not necessarily to be regarded as producing the optimal diet for physical and mental efficiency of the race. We find, for example, the Bengali living on a rice diet, which is poor both in quality and quantity of protein, poor in mineral salts and poor in vitamins. The Japanese, living on a diet deficient in fat-soluble A, are stunted in growth; transferred to California and nourished from birth on a more adequate mixed diet, the race increases in stature and strength. Unfortunately, in the midst of abundance of all necessary food factors, we on this continent are excluding from our foods by excessive milling and refining many of the essential food factors. The development of pellagra, defective dentition, and rickets on this continent is unnecessary and inexcusable when one considers they are wholly preventable by the use of a better balanced diet, not only in infancy but throughout life. The diet of expectant mothers, especially, is to be improved if defective dentition is to be prevented, since the enamel layer of the teeth is laid down before the birth of the child.

The optimal diet will contain, then, an adequate supply of fluid, of condiments, of roughage. It will contain milk, eggs, fish and meats for its supply of suitable amino acids. In this connection, let me draw attention to the fact that muscle meats are inadequate for the replacement of body protein, and should be supplemented by the glandular organs of animals. It will contain cereals as sources of carbohydrate, preferably in natural form, without excessive milling. It will contain fats for their energy value and also as carriers of the fat-soluble vitamins. Lard, olive oil and cottonseed oil are practically free from these valuable foodstuffs, but the deficiency can be made up by including the leafy vegetables which are also rich in these substances as well as in mineral salts. Eggs, the germ of cereals, tubers and roots will supply vitamins B and G. Fruits and fresh vegetables supply the anti-scorbutic vitamin. Particular care should be exercised to secure a moderate supply of milk and the leafy vegetables, since these two varieties of food supplement effectively the deficiencies of other foods in energy, protein, mineral salts, fluid and vitamins.

The assembly of these foodstuffs into meals will vary largely according to the tastes of the individual or the customs of the region in which he lives. Bulky foods of low nutritive content should probably be used first, since they will thereby be better comminuted, the condiments and flavours will be better liberated to excite secretion of the digestive juices and also because meats, fats and sweetened foods soon cloy the appetite and cause a sense of satiety which may be entirely false. The use of beverages with meals, in so far as it interferes with the efficient chewing of the foods, is not of advantage.

There is at present a marked tendency to commercialize the scientific results of tomorrow. Nowhere is this more marked than in the dietetic field. While little is as yet known with regard to their deleterious effects, and even less is certainly known as to their possible usefulness in the adult, the field of the vitamins is already highly commercialized. When one realizes that proof of vitamin deficiency in the majority of the adult population is considerably less than scanty, one is justified in looking with some doubt on the intensive efforts to popularize the

universal use of certain foods because of their added vitamin content. Medicine itself has passed the crisis of the bulk, roughage, and mineral oil fever that possessed it some years ago, but for our sins we are still plagued by its commercialization. The "Eatmor this" and "Drinkmor that" campaigns flourish on a very small modicum of truth. It should be realized, however, that milk itself is harmful to adults and even to children if used in unsuitable amounts.

Disease is often the result of unsuitable selection of food. More often the disease demands an alteration in the foodstuffs because of the derangement of digestion or of the metabolism of the body consequent upon the disease process. Rickets, scurvy, pellagra, beriberi, defective dentition, osteomalacia, ophthalmia, famine œdema, are well recognized examples of such unsuitable selection of foods, but it should not be imagined that because a definitely recognizable deficiency cannot be discovered that the individual will be necessarily in the best of health. Physical and mental inferiority, lowered vitality, susceptibility to infections may be at bottom the result of unsuitable diet, not alone in the individual but in his forebears. The aim of scientific studies on nutrition is to eradicate, if possible, these causes of disease and prevent rather than cure the conditions.

Diet, however, forms an important adjunct to treatment in many diseases and in some disturbances of metabolism is, indeed, the most important part of the treatment. During fever it is well known that there is an increase in metabolism of 13 per cent for each degree centigrade rise in temperature, and there is no doubt of the increased protein destruction during fever. It is desirable that this protein should be replaced, if possible, even during the acute illness. Attempts are also made to diminish this breakdown by the use of high calorie diets, which in typhoid fever consist largely of easily digestible carbohydrate. Water loss is an important factor in any illness, since the tissues require their protoplasm in a certain optimal concentration for the most satisfactory functioning of the body. Water loss from the skin and lung is also one of the most efficient means of maintenance of normal body temperature, owing to its high latent heat of vaporization. The extent of water loss from this source is not generally realized and many patients are being given much too little fluid. Woodyatt has well shown the antipyretic action of liberal water intake during fever, and the benefit the patients receive is not alone confined to the cooling of the surface of the body but also extends to washing out some of the toxic products of the infection.

Because it has been recognized that the digestive system is injured by toxic action in a generalized infection, it is now considered advisable to supply liberal fluids, to keep the bowels well opened to avoid absorption of putrefactive products, and to feed the patient frequently in small amounts, well cooked, palatable foods which will tempt his appetite and induce a secretion of the digestive juices in the alimentary tract. Keeping the mouth clean and well moistened is another means of increasing the quantity of the food eaten by the patient. It is now possible to feed even pneumonia patients at the height of fever with a liberal diet containing adequate amounts of protein.

With the better understanding of metabolic diseases a more adequate dietetic treatment of these conditions may be employed. In the toxic varieties of goitre the metabolism of the patient at rest is one and one-half times the normal, while the irrepressible, excessive muscular movements of the patient often make him burn 4,000 to 5,000 calories per day. Unless this is understood and provided for, the patient rapidly loses weight, often becomes dehydrated, and stands in danger of a thyro-toxic crisis. While many such patients will eat ravenously of bulky foods at the regular mealtime, it is wise to arrange for smaller and more numerous meals and supplementary feedings throughout the day and late in the evening, to overcome the excessive loss of weight and strength. An excessive intake of muscle meat, with a deficient supply of vegetables containing little iodine, is associated with the development of many cases of colloid goitre. In all types of anæmia an excess of protein intake is desirable. The protein should be largely of the Class A type, with special attention to the supply of red meats and glandular organs, such as liver, which most adequately restore the hæmoglobin to normal levels. In obesity the aim of treatment is not rapid reduction in weight but a gradual decrease due to the burning of increased amounts of body fat, prescription of definite amounts of exercise, and provision of a diet relatively little decreased in

protein but decidedly reduced in fat and carbohydrate. Strict conformity with the prescription is the essence of successful treatment of obesity.

In nephritis, the problem is to provide rest for the injured organ. As the deficiencies of the kidney vary at different stages of the disease the dietetic régime will be at first the restriction of total calories, fluid and mineral salts. With improvement, more calories in the form of carbohydrate and fat will be allowed, and, still later, the protein intake will be raised to 60 to 80 g. per day. Probably at this stage some restriction of fluid and mineral salts will be required. In the latter stages of the disease, with oncoming nitrogen retention, the total protein intake must be restricted. At this time, however, particular care is taken to provide meat and other Class A proteins to replace the daily destruction of body protein. There is no virtue and much harm in the prohibition of the red meats as formerly practised.

It is desirable that the diabetic patient receive a diet adequate in protein and in calories, with sufficient fluid, mineral salts and vitamins, not only that he may live but that also he may take care of himself and do useful work in the world. Two-thirds to one gram of protein per kilo body weight is usually adequate, if supplied in suitable form. The remaining calories are divided between fat and carbohydrate in such a way that protection from acidosis is afforded. The use of butter, eggs, cream and the leafy vegetables furnishes the necessary amounts of the various vitamins. If the full caloric requirement of the individual is not met without overtaxing the pancreas and causing hyperglycæmia and glycosuria we may now supply the deficiency with insulin. Insulin is not, however, to be regarded as replacing the internal secretion of the pancreas completely and adequately.

Perhaps the most important problem in nutrition today is the dietetic treatment of the expectant and the lactating mother. On the solution of this problem rests the abolition of many gastro-intestinal disturbances in infants and a large proportion of the mentally and physically inferior children of low vitality, poor dentition, rickets, and many stigmata of degeneracy, which are not present among primitive peoples. Instead of curing disease, we must start at the beginning and prevent it. Fortunately, we now know enough to make a beginning, but, unfortunately, this knowledge is not disseminated among the people where it would be of value. Bearing in mind that the mother must supply from her own stores or from ingested foodstuffs practically all the building blocks for forming the child's body and inducing normal growth of organs and tissues, we should see to it that every expectant and lactating mother is supplied with an adequate caloric intake. An adequate supply of protein of high biological value, particularly of milk, and a liberal supply of leafy vegetables and roots as salads, and a moderate supply of raw fruits, with the addition of iodine in those regions where it is deficient, would do much to improve the condition of the infant and his future prospects in life.

COMMERCIAL GLANDULAR PRODUCTS.—M. S. BISKIND warns that perhaps no group of pharmaceutical preparations in recent years has been the subject of such extravagant claims as that comprising allegedly active materials derived from various glands, non-glandular organs and body fluids. Hardly a tissue or fluid of the body has escaped desiccation or extraction; substances so obtained are marketed in pills, tablets, capsules, vials and ampoules for introduction into the body by every conceivable route. Only a small percentage of the many preparations are known to contain active material; and with the few exceptions (thyroid, liver, stomach, adrenal cortex, and some estrogenic principles) the products administered by *mouth* have little effect even if they do contain some active principle or principles. The active substances are either destroyed by the digestive juices or if not broken down they may not be absorbed from the intestine. Thus, glandular therapy by the oral route is in general quite limited; even when effective it is usually wasteful, as much more material must be used owing to poor absorption. However, when dealing with relatively impure products that may have toxic effects on parenteral injection it may be preferable to administer the preparation orally, if feasible. An example of this is adrenal cortex extract. Purification, particularly important for preparations intended for parenteral use, involves many difficulties. Assay involves still further difficulties. The majority of methods employed are biological; the effect of a given preparation is determined on some physiological function in a test animal. At best biological assay entails very large errors. Much confusion arises from the present deplorable state of endocrinological nomenclature; this is particularly true with respect to commercial products. Not infrequently the physician is confronted with a series of products purporting to be similar but sold under widely different names, or with other products unquestionably different but marketed under similar names. The author describes various commercial glandular products, mentioning well known substances described in the U.S. Pharmacopœia or in New and Non-official Remedies briefly or not at all. Emphasis is placed on the more important products marketed in the United States. He concludes that clinical applications of many of the newer commercial glandular products are on a very unsatisfactory basis. Physicians, particularly those who do not have facilities for controlled clinical observation, would do well to be guided by the judgment of the Council on Pharmacy and Chemistry in the use of these products. The advertising propaganda of pharmaceutical manufacturers cannot be depended on as a safe guide in this respect.—*J. Am. M. Ass.*, 1935, **105**: 667.

RENAL AMYLOIDOSIS*

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FROM the earliest description by Hodgkin in 1832 there have been many pathological observations of amyloid disease, but until the last decade the various clinical features were overlooked and clinical diagnosis was seldom made except in cases of the text-book type. The frequency with which amyloid disease has been encountered in the Montreal General Hospital recently is the basis of this communication.

Amyloidosis may appear independently of any known causative disease, the so-called "idiopathic" amyloidosis.[1] If there is evidence of any general disease process commonly producing amyloid disease, such cases may be separated as amyloidosis complicating the primary condition. In the combined series of Dixon[2] and Rosenblatt[3] pulmonary tuberculosis was present in 176 cases; tuberculosis of bone in 12; malignant tumours in 15; empyema in 5; pyonephrosis in 4; chronic arthritis in 3; and one each of the following diseases, multiple myeloma, lues, lung abscess, chronic osteomyelitis, lymphatic leukæmia and bronchiectasis; in 4 cases no cause was found. The association with some form of tuberculosis is well known, but the incidence in other diseases is not often appreciated clinically. Such unexpected association was noted in this series, as in Case 1.

CASE 1

A patient with generalized Hodgkin's disease of three years' duration. Two months before his death, two groups of symptoms appeared, on the one hand, vomiting and diarrhœa, and, on the other, albuminuria and general anasarca. The significance of the massive albuminuria was overlooked, and the generalized œdema was attributed to pressure upon the vena cava from mediastinal and intra-abdominal glandular involvement, since early in the illness there had been localized œdema of the scrotum and the left leg due to enlargement of the inguinal glands. At autopsy this was not confirmed, but there was diffuse amyloidosis of the spleen, liver, kidneys, adrenals and gastro-intestinal tract. Here, the albuminuria and œdema can be explained by the renal amyloid infiltration, and the vomiting and diarrhœa in all probability resulted from amyloid deposits in the digestive tract.

This case is mentioned because of the few reports of amyloidosis with Hodgkin's disease,[4] and because of the absence of suppuration. To the older clinicians suppuration was the basic requirement for the development of amyloidosis, but it is no longer regarded as a necessary one.

While amyloid deposits may be found in almost any organ or tissue, there are certain predilections, as demonstrated by the series of Rosenblatt, in which the spleen was involved in 80 per cent of the cases, the kidneys in 63, the liver in 58 and the adrenals in 40. Amyloidosis of the liver and spleen presents no manifestations beyond enlargement. Amyloid destruction of the adrenals may be responsible for part of the symptoms of amyloidosis, and hypotension may be accounted for by this lesion. A clinical diagnosis of amyloidosis need not be withheld because of the absence of enlargement of the liver or spleen.

TABLE I.

WEIGHTS OF ORGANS IN CASES WITH AMYLOIDOSIS AT AUTOPSY. (IN GRAMS.)

	Liver	*Spleen*	*Kidney*		*Heart*
			Right	*Left*	
Normal	1500	170	150	150	300
Case 1	980	125	175	150	320
Case 2	1255	350	220	270	210
Case 3	3950	550	70	210	230
Case 4	1250	400	150	170	300
Case 5	1350	175	192	220	375

In patients with amyloid disease the commonest manifestations are those associated with impairment of the renal function. Abrami *et al.*[5] suggested that there were three clinical forms: (*a*) the type with albuminuria alone; (*b*) the type with œdema; and (*c*) the type where there was also nitrogen retention. These are successive stages of the syndrome, depending upon the severity and duration of the primary disease. Bell[6] observed that albuminuria

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was present in all but 4 of 65 cases with amyloid kidneys, and concluded that the absence of albuminuria was conclusive evidence that there was very little or no amyloid in the kidneys at the time. Albuminuria was noted in 90 per cent of Dickinson's[7] cases and in 92 per cent of Dixon's[2] cases. The amount of albumin in the urine varies considerably. All of the ordinary casts have been found but amyloid casts have been rarely reported. Hæmaturia has been observed occasionally.[8]

nephritis) as described by Leiter. The blood pressure may be normal or hypotensive but in several instances, hypertension has been present, Noble and Major,[9] Bell[6] and Dixon.[2] Urea-nitrogen retention occasionally occurs. In the series of Bell, the blood urea-nitrogen was over 30 mg. per 100 c.c. in 29 per cent of cases, and over 100 mg. per 100 c.c. in 9 per cent. In this series poor renal concentrating ability was observed in 3 instances and the urea concentration factor was reduced similarly.

TABLE II.

DEMONSTRATING CHANGES IN BLOOD CHEMISTRY AND RENAL FUNCTION IN PROVED CASES OF AMYLOIDOSIS

Case	*Albuminuria*	*Œdema*	*Blood Urea Nitrogen mg. per 100 c.c.*	*Plasma Proteins Per cent*			*Sp. Gr. Max.-min. Variation*	*Urea Concentration Factor*	*Congo Red Disappearance Per cent*
				Total	*Alb.*	*Glob.*			
1	2 plus	4 plus	55	6.1	1.2	3.4	2 points		
2	3 "	3 "	25	4.4	2.7	0.8			90
3	3 "	3 "	27	5.8	1.8	3.4			
5	3 "	4 "	18	4.4	1.9	2.0			55
7	3 "	4 "	21	5.0	0.2	3.6	6 points	32	64
	(One month later)		29	6.2	1.0	3.6		20	70
8	3 plus	none	10	7.0	3.1	3.0	10 points		100

Note.—In the last case marked albuminuria was present but no œdema. The duration of the albuminuria had been so short that it had not as yet reduced the plasma proteins, and especially the albumin factor, and, therefore, œdema had not occurred.

The next sign in order of frequency is œdema. It was present in 50 per cent of Bell's cases, in 75 per cent of Dickinson's and in 24 per cent of Dixon's. Bell stated that it was as frequent with minimum as with maximum deposits of amyloid in the kidneys. It would appear that the œdema is related to the existence of albuminuria, and that it depends upon the development of the nephrotic syndrome. As Christian[1] points out, there may be a difference of opinion as to whether nephrosis is merely a form of nephritis or whether nephrosis is a distinct pathological entity, but all would agree there is a distinctive clinical picture. The œdema results from long-continued albuminuria which causes progressive depletion of the blood serum proteins. When the serum proteins and, in particular, the albumin fraction, have been sufficiently reduced, œdema appears subsequent to the marked lowering of the colloidal osmotic pressure of the blood.

By those who admit renal amyloidosis to their particular classification of nephritis it is generally placed in the sub-group of nephrosis. The remaining signs, however, differ from the clinical feature of lipoid nephrosis (pure tubular

From the pathological point of view numerous observers, Noble and Major, Bell, and Dixon, conclude that the renal insufficiency results from obstruction of the afferent arterioles of the glomeruli or occlusion of the capillaries of the glomerular tufts of the kidneys by amyloid deposit. With complete occlusion there is cessation of function of that particular glomerulus. The associated tubules then atrophy. It is primarily a glomerular injury and tubular degeneration is a secondary phenomenon. The kidneys are usually larger than normal, but may be normal in size or contracted. Most frequently death occurs before the kidneys have had time to become contracted. These latter findings of chronic glomerular nephritis tend to separate renal amyloidosis from pure lipoid nephrosis.

The congo red test was introduced by Bennhold[10] in 1923 as a specific test for the clinical diagnosis of amyloidosis. It is much more conservative than the drastic method of liver or spleen puncture suggested by Waldenström. The test depends upon the absorptive affinity of amyloid tissue for the intra-vital dye. The congo red dye (15 c.c. of 1.2 per cent solution) is given intravenously, and blood specimens are

obtained at the end of four minutes when the dye is uniformly distributed, and also at the end of one hour. The normal rate of disappearance of the dye as measured by colorimetric comparisons of the blood serum, is 20 per cent at the end of one hour. Bennhold concluded that with a disappearance over 60 per cent a positive diagnosis of amyloidosis could be made, and that a disappearance of 40 to 60 per cent occurred in only nephrosis or in amyloid disease. These conclusions have been frequently confirmed (Bookman and Rosenthal[11]).

TABLE III.

COMPARISONS OF THE RATE OF CONGO RED DISAPPEARANCE IN PATIENTS WITH AND WITHOUT AMYLOIDOSIS

With Amyloidosis	*Congo Red Disappearance Per cent*
Pulmonary tuberculosis	64
One month later	70
Electrical burns*	90
Pulmonary tuberculosis*	55
Chronic osteomyelitis	100
Tuberculous kidney (post-operative)	100

Without Amyloidosis	*Congo Red Disappearance Per cent*
Hypertensive cardio-renal disease	30
Hypertensive cardio-renal disease	5
Carcinomatosis (prostate)*	20
Lung abscess, lues, colitis	20
Choleliathisis	23
Chronic nephritis with œdema	29
Chronic nephritis with œdema	26
Luetic nephritis	43

*With post-mortem confirmation.

Rosenblatt[12] states that when amyloidosis develops in the course of an illness it is indicative of a poor prognosis only because it reflects the unfavourable condition of the underlying disease, and that amyloidosis modifies the course in a very limited number of cases. This is true of cases in which organs are involved that do not produce symptoms beyond their own enlargement, such as the liver and spleen. However, when there is amyloidosis of the kidneys, gastro-intestinal tract, or adrenals in which severe manifestations are exhibited, it is felt, from the clinical experience of this series, that the course is definitely altered and the end is hastened. This was definitely demonstrated in Case 2.

CASE 2

This patient had suffered severe electrical burns two years previously, which were gradually healing and he had become ambulant. Four months before death he developed intractable diarrhœa, secondary anæmia, massive albuminuria and general anasarca. The percentage rate of disappearance of the congo red was 90. In spite of several blood transfusions death occurred. At autopsy there was diffuse amyloidosis of the kidneys, intestine, adrenals, liver and spleen.

If amyloidosis had not complicated the primary condition, the patient would probably have recovered.

Spontaneous recoveries have been rarely reported. Disappearance of amyloidosis has been noted after successful surgical treatment of the primary disease (Reimann[13]). Whitbeck[14] has lately observed beneficial results following the oral administration of powdered liver extract in divided doses of 12 grams daily in patients with surgical tuberculosis and amyloidosis. It was originally given because of the presence of secondary anæmia. Of 7 cases so treated 5 showed no clinical evidence of amyloidosis at the end of a period varying from 12 to 18 months. The other two cases improved so far as the features of amyloid origin were concerned but died of tuberculosis. The mode of action was not known and the beneficial effects were not noted until after three months of treatment.

The following case was of interest primarily because amyloidosis was associated with chronic non-suppurative polyarthritis. Hardgrove[15] has observed a similar one. Secondly, improvement of the symptoms of amyloid origin apparently was subsequent to the administration of liver extract orally.

CASE 3

The patient was a forty-three year old male who had been hospitalized continuously for one and a half years with arthritis deformans. Otherwise the system examination was negative. The blood pressure was 110/70. The urinary findings were always normal. The blood urea nitrogen was 14 mg. per 100 c.c. There was no previous history of any renal disturbance. The patient then developed a few localized abscesses on the lower extremities which necessititated surgical care and prompt healing occurred. On returning from the Surgical Service general anasarca was noted. The urine examination revealed massive albuminuria, occasional granular and hyaline casts and slight hæmaturia. There was no evidence of cardiac decompensation. The ocular fundi were negative. It was impossible to determine the size of the liver or spleen because of the extent of the ascites. The blood pressure gradually increased to 200/120. The blood urea nitrogen slowly rose to 43 mg. per 100 c.c. The renal test meal showed a maximum-minimal specific gravity variation of only two points between 1.016 and 1.018. The urea concentration factor was only 26 (normal, 40-50) and the blood urea clearance was 19 (normal, 45-55). The phenolsulphonephthalein excretion was 12 per cent at end of two hours.

There was a reduction of the total plasma proteins and a reversal of the albumin-globulin ratio. In spite of various diets and diuretics the symptoms persisted for three months.

The possibility of amyloid disease complicating the arthritic condition was then suggested. On the first determination the congo red disappearance was 37 per cent, but one month later it was 74. With this positive laboratory finding in favour of amyloidosis, the oral administration of liver extract was commenced. The daily dosage was 10 grams. The course was unaltered for another period of three months, but soon afterwards the œdema melted away. The albuminuria disappeared. There were only occasional casts and no hæmaturia. The blood pressure dropped to 118/74. The nephrotic syndrome ceased. There was an eight point variation in the maximum-minimum specific gravity readings of the renal test meal. There was evidence of return to normality in the other tests of renal function, as well as in the congo red disappearance.

Table IV.

Relevant Findings in Patient with Chronic Polyarthritis and Amyloidosis

Date	*Œdema*	*Albuminuria*	*Blood Pressure*	*Blood Urea Nitrogen mg. per 100 c.c.*	*Plasma Proteins Per cent*			*Sp. Gr. Max.-min. Change*	*Urea Concentration Factor*	*Congo Red Disappearance Per cent*
					Total	*Alb.*	*Glob.*			
Mar., 1933	0	0	110-70	14						
Aug., 1934	4 plus	4 plus	130-90	42	5.5	1.8	3.3	2 points		
Oct., 1934	"	"	204-82						26	37
Nov., 1934	"	"	200-120	(Liver therapy commenced)						74
Feb., 1935	0	1 "	170-110	15						40
Mar., 1935	0	trace	118-74		6.5	3.9	2.0	8 points	30	27
Apr., 1935	0	V.F.T.	118-70						45	
May, 1935	0	V.F.T.	108-70	25					47	

Although there was a chance that the underlying condition was sub-acute glomerulonephritis with œdema, there were several features which indicated that renal amyloidosis was the more probable lesion, namely, the development of œdema and albuminuria in a patient with a chronic illness, the disappearance of 74 per cent of the congo red, and, finally, the tendency towards improvement of the renal function after the œdema had subsided. Therefore, this patient was considered as one having amyloid disease complicating arthritis deformans, which showed marked regression of the symptoms of amyloid origin under treatment with liver. The state of the primary lesion, chronic polyarthritis, remained unchanged.

Summary

Amyloid disease, while more prevalent in patients with some form of tuberculosis, occurs also in other conditions. In these latter atypical cases the presence of amyloidosis is often overlooked, clinically. The appearance of massive albuminuria and œdema in a chronic illness should suggest the possibility of amyloid disease. These are the most frequent signs and result from renal amyloidosis.

The use of the congo red test will aid in the clinical diagnosis.

Amyloid disease may disappear after adequate treatment of the primary disease, but the use of the liver extracts as a specific form of therapy should be further investigated.

Three unusual cases of amyloid disease are presented, in which the primary conditions were, respectively, Hodgkin's disease, extensive electrical burns, and arthritis deformans. The last case was apparently benefited by the use of liver.

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SURGERY IN THE TREATMENT OF PULMONARY TUBERCULOSIS*

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TWO factors are chiefly responsible for a recent increase of interest in the treatment of pulmonary tuberculosis by collapse. An improved follow-up of sanatorium cases has led to more accurate knowledge of the prognosis in various types of lesions. These studies have demonstrated that in patients with an open cavity and positive sputum there is a 60 to 70 per cent expectancy of death in three years and an 80 to 90 per cent in five years. The great majority of these patients will have remained chronic invalids. The second factor is a marked decrease in operative mortality occasioned partly through an improvement in operative technique and partly by a change in the selection of cases. A more widespread application of this type of treatment will result not only in a marked decrease in the mortality from tuberculosis but in a lessening of the menace from open cases, and, through a shortening of the period of treatment, in a considerable saving to the community.

Pulmonary collapse is brought about by (1) pneumothorax; (2) paralysis of the diaphragm; (3) scalenectomy; (4) pneumolysis, either intra- or extra-pleural; and (5) thoracoplasty. Of these pneumothorax and thoracoplasty are the most important and capable of the widest application, but each of the other procedures is valuable in particular cases. While pneumothorax and phrenic paralysis may be indicated in the absence of excavation, to render more complete rest to the diseased lung than can be obtained by bed rest alone, the chief indication for collapse is the presence of open cavities. The bacilli-laden sputum arising from such cavities is a constant menace to the patient, and sooner or later will lead to an extension of the disease. Many tuberculous infections of the lung are relatively acute in type and produce a limited destruction of pulmonary tissue. If such areas are collapsed so that complete healing may occur the problem is not very different from that presented by lesions elsewhere in the body, and the patient's chance of remaining well is reasonably good. If any considerable destruction of tissue has occurred permanent healing through rest alone is unlikely, since the rigid chest wall prevents the adequate contraction of the fibrous tissue by means of which healing is brought about. If the spread of such an initial area of disease is to be prevented the institution of collapse should not be delayed beyond the relatively short period required to determine the reaction to bed rest alone. In the presence of gross hæmorrhage the area from which bleeding is thought to arise should, if at all possible, be collapsed at once, not only because of the direct menace from loss of blood but because of the likelihood of a spread.

Tuberculous pulmonary cavities may be single or multiple. They occur as a result of caseation of a tuberculous area with subsequent liquefaction and rupture into a bronchus. In the early stages the larger cavities are always thin-walled and easily collapsed. With the lapse of time the wall becomes increasingly rigid. They should, where possible, be overcome before too much fibrosis has occurred. Multiple small excavations in the midst of a block of dense fibrous tissue are difficult to overcome immediately, and a considerable time is required for their obliteration by fibrous tissue, even after an adequate thoracoplasty has been performed. In general it may be said that cavities of three centimetres or more in diameter are unlikely to disappear spontaneously. While it is true that much larger cavities will close occasionally with the lapse of time alone, such occurrences are so unusual and the presence of the cavity such a danger to the patient that this possibility should not constitute an argument against collapse, if the other lung is good enough.

Pneumothorax. — While the institution of pneumothorax is, strictly-speaking, a surgical procedure it is done usually by the chest physician. When adhesions do not prevent its use it is the best of all forms of collapse therapy. The operation is a relatively simple one, involving

* Presented at the Academy of Medicine, Toronto, as part of a post-graduate course for general practitioners, January 11, 1935.

a minimum of discomfort and danger. The degree of collapse is controllable, and the operation may be used therefore in the presence of considerable disease in the contra-lateral lung, and in special cases even to produce partial bilateral collapse. While the initial danger is small, the procedure should not be undertaken lightly, since even in skilled hands numerous complications may occur. When a pneumothorax is found to be inefficient, in that the cavity or cavities have not been collapsed because of adhesions which bind the diseased area to the chest wall, it should be supplemented by phrenic paralysis or pneumolysis when indicated; otherwise, discontinued in favour of thoracoplasty. One frequently sees patients who have carried partial pneumothoraces over long periods, even though nothing more than a collapse of the uninvolved area of lung was ever obtained. Such patients have not only received no benefit from pneumothorax treatment but frequently require a complete thoracoplasty because the lower part of the lung has become bound down by a thickened visceral pleura, whereas earlier a relatively localized thoracoplasty would have been sufficient to collapse the diseased area.

Diaphragmatic paralysis.—This may be temporary or permanent. In either case the phrenic nerve is exposed in the base of the neck under local anæsthesia. If a temporary paralysis only is desired the main portion of the nerve is crushed with a pair of forceps or injected with alcohol; the accessory branches are located and divided. If a permanent paralysis is aimed at a considerable segment of the main nerve is removed at the same time as the accessory fibres are divided, or after division of the nerve the distal portion is evulsed so that fibres joining it more distally may be torn across. The latter procedure is likely to involve a certain amount of discomfort and is not quite free from danger. Division alone, providing that the accessory filaments are located and divided, is usually sufficient. Paralysis of the diaphragm is likely to have the greatest effect upon the lower and mid-lung fields, but is capable of affecting to a considerable extent even the apex.

This procedure is indicated in early disease of the lower portion of the lung, in certain cases with bilateral involvement in whom pneumothorax has been found impossible, for the collapse of cavities in the lower and mid-lung fields, to relieve an irritating cough associated with adhesions to the diaphragm, to control hæmoptysis where pneumothorax cannot be done, as an accessory to pneumothorax, to farther reduce the activity of the lung or to relax the diaphragmatic adhesions and the pulmonary ligament and so permit the collapse of cavities held open by a more or less vertical pull upon the adhesions, and to render more complete the collapse obtained by thoracoplasty. In certain cases where only a temporary aid to healing is thought to be necessary it may be used instead of pneumothorax since it involves less danger and, unlike pneumothorax, once performed, does not necessitate continuance over a long period. Phrenic paralysis should be performed often when a pneumothorax is being discontinued. At present the tendency is to produce first a temporary paralysis in the majority of cases. This is done because it is impossible to foretell the benefit that will be derived by any given patient, and particularly when the disease is involving chiefly the upper part of the lung it may be advantageous to preserve the function of the lower portion after the more diseased area has been collapsed by an upper thoracoplasty. Certain patients, following paralysis of the left diaphragm, suffer from indigestion which, although usually slight, may be sufficient to interfere seriously with the intake of food. Where such symptoms are severe it is better that recovery of movement should occur. It is a simple matter to render a temporary paralysis permanent at a second sitting.

Phrenicectomy is an extremely useful procedure, but, like all relatively simple operations, has sometimes been discredited because too much has been expected of it. While brilliant and unusual results are obtained occasionally, it should not as a rule be expected to be sufficient in itself to control extensive disease.

Scalenectomy.—Division of the anterior, middle and posterior scalene muscles, either alone or in association with phrenic paralysis, is done for the control of apical disease when the lesion is considered too slight to warrant thoracoplasty, or in certain cases where the condition of the patient does not permit of thoracoplasty. It removes the lifting action of the scalenes upon the upper three ribs, and probably brings about a certain amount of collapse of the apex through an increased obliquity of these ribs. Although a more extensive pro-

cedure than exposure of the phrenic nerve alone, it may also be done under local anæsthesia with a minimum of disturbance and danger. It appears to be useful chiefly in the control of very localized apical disease associated with the formation of a quite small cavity or cavities. For anything more extensive than this a three-rib thoracoplasty is to be preferred.

Pneumolysis.—In a rather small number of patients receiving pneumothorax an otherwise satisfactory collapse is rendered inefficient through the presence of band or string-like adhesions which suspend the lung to the chest wall and prevent the collapse of a cavity. Such pneumothoraces may be made efficient by division of the offending adhesions, a procedure known as intrapleural pneumolysis. Formerly, the adhesions were exposed by resection of a suitable portion of rib and divided under vision. This procedure has been replaced almost entirely by division through a thoracoscope (with a thermocautery). In suitable cases this operation removes the necessity for an extensive thoracoplasty. The chief complications are hæmorrhage and infection, both of which may be avoided largely through careful work. Extrapleural pneumolysis consists in the stripping of the parietal pleura from the chest wall through the layer of loose areolar tissue, known as the endothoracic fascia, which lies between the parietal pleura and the overlying ribs and muscles. It is used chiefly for the collapse of apical cavities, under which conditions it is frequently called apicolysis. Various substances have been used as a plug or tampon for the resulting extrapleural cavity, of which the more important are fat, muscle, gauze, and special paraffin preparations. No entirely satisfactory substance has yet been found, but paraffin is at present regarded as the best. The immediate danger is that the dissecting finger may tear into a cavity in the underlying lung or rupture a large blood vessel. Both of these accidents appear to be surprisingly rare. The later complications consist in infection about the paraffin, organisms entering either from without or from the underlying lung, or rupture of the paraffin into a pulmonary cavity through necrosis of its wall. The latter may happen even years later. Despite its obvious disadvantages this is a useful procedure in certain patients with apical cavities, the collapse of which is imperative if they are to have a chance of recovery, but in whom pneumothorax is impossible because of adhesions and thoracoplasty out of the question because of their general condition or of extensive disease in the other lung. It may be done usually under local anæsthesia.

Thoracoplasty.—After pneumothorax this is the best and most widely applicable form of collapse. The first posterior extrapleural thoracoplasty was performed by Sauerbruch in 1911. The operation was introduced into this continent by Archibald in 1912. It has gained an accepted place in the therapy of pulmonary tuberculosis. The tendency to remove fewer ribs at each stage and to effect local collapse of cavities rather than to use a standard operation for all cases regardless of the type or distribution of disease has widened greatly its application. Although thoracoplasty should be done in the presence of unilateral chronic fibroid phthisis in which open cavities cannot be demonstrated clinically or radiologically, where frequent relapses occur with positive sputum or hæmorrhage, or both, its chief use is in the collapse of cavities. Even in such cases it undoubtedly acts through the collapse of small cavitations the presence of which the x-ray is unable to demonstrate.

The type case which Sauerbruch regarded as ideal for thoracoplasty was one in which the disease was definitely chronic and which had demonstrated over a long period a considerable resistance to tuberculosis. There was to be evidence of fibrosis in the lung and of contracture, as demonstrated by an increased obliquity of the ribs, a retraction of the mediastinum toward the affected side, and elevation of the diaphragm. Such patients are still regarded as suitable, but by no means as the most desirable type. The mere presence of the disease over such a long period results in tissue degenerations which it is not always possible to recognize by clinical tests, but which influence profoundly the operative risks. It is in just such patients that an operative mortality must be feared. They might be compared justifiably, perhaps, to the patient who has had a toxic thyroid over a long period of time. Further, awaiting the development of such a clinical picture must result in the death of numbers of patients who, had their cavities been collapsed, would have had a reasonable chance for recovery.

Our aim should be to collapse every open tuberculous cavity of more than three centimetres in diameter which has persisted for more than a few months, providing that the general condition of the patient is such that the operation is likely to be withstood and the disease in the remainder of the lung is not so extensive as to make operative interference unjustifiable. The location of the cavity is of great importance. Fortunately, the majority are in or near one apex and may be collapsed by relatively local operations. Many patients may be subjected safely to the removal of the first three ribs who would be unsuitable for anything more extensive. Similarly some will withstand safely a six-rib thoracoplasty who would not be satisfactory subjects for a complete thoracoplasty. Cavities in the mid-lung field and those placed deeply near the lung root require extensive operations for their collapse, and such patients should not be accepted unless the contra-lateral lung is good. Small, bilateral apical cavities may be treated by bilateral upper thoracoplasties. It is difficult to foretell what may be the course of the remaining disease in any particular patient following the surgical collapse of the excavated area. Finally, it must not be forgotten that a patient who from a study of the radiograph of the chest would be considered an ideal subject for thoracoplasty, because of a limited respiratory excursion and low vital capacity or co-existing extrapulmonary disease may be quite unsuitable.

Thoracoplasty has passed the experimental stage and become an important part of the treatment of pulmonary tuberculosis. It is possible that our attitude to the operation may shortly become somewhat similar to that toward the operative treatment of malignant disease—that the patient who has no chance of recovery without operation, and even a minimal chance with it, should have that small chance. At present, in this locality at any rate, the procedure has not been practised widely sufficiently long to justify such an attitude, and the choice of cases should be definitely more conservative. A spread of the disease some time after thoracoplasty should not necessarily be attributed to the operation, since from statistical studies one knows that in the presence of an open cavity such spreads occur early in a very high proportion of cases. The person with an open cavity, whose tenure of life is as short as has been demonstrated, and who is likely to remain a chronic invalid as long as he lives, is not gambling much when he consents to operation.

SOME RESULTS OBTAINED IN THE TREATMENT OF ATROPHIC RHINITIS (OZÆNA)*

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THE treatment of atrophic rhinitis associated with offensive odour (ozæna) has been most discouraging both to the patient and to the physician. The purpose of this communication is, not to enter into any discussion as to the relative values of the many varied and often ingenious methods which have been used in the past or are in use at the present time but to give a brief report of the results which have been obtained in the past five years at the Ear, Nose and Throat Clinic of the Montreal General Hospital, by the use of radium.

Attention was brought to this method by a paper published in 1929 by Louis Hubert and G. Allen Robinson,[1] giving the results in 5 cases treated by them with radium. They did not claim to have effected a cure, but in their summary, stated that in four cases the foul odour disappeared and in one case it was much diminished. In all cases the crusts became much less in quantity and softer in consistency. Vasilia,[2] in 1925, reported 4 cases cured by radium.

Some 21 cases have been treated in our clinic and followed up. I say followed up advisedly, because these patients are, as a rule, eager to cooperate with the physician, once they realize that some relief is possible and they are being saved from social ostracism. In the earlier cases

* A paper read before the Section of Oto-Rhino-Laryngology, Montreal Medico-Chirurgical Society.

the technique suggested by Hubert and Robinson was followed. Later, modifications were introduced, and within the past year we have supplemented it in selected cases by taking cartilaginous transplants from the rib and introducing them under the muco-periosteum in order to reduce the airway and render the patient better able to expel secretion or crusts when necessary. These latter cases, naturally, are those in which there have been very marked atrophic changes and associated with bone resorption and wide open nares. Dr. B. F. McNaughton, Associate Laryngologist to the Montreal General Hospital, has kindly undertaken this portion of the work.

Before discussing the technique employed and submitting a summary of the cases treated, a few words may be said concerning atrophic rhinitis.

Atrophic rhinitis; synonyms—ozæna, coryza fœtida, sclerotic rhinitis, dry catarrh.

Ozæna is essentially a chronic condition characterized by atrophy and sclerosing of the nasal mucous membrane and the underlying bone, associated with an abnormal patency of the nasal passages, a fœtid muco-purulent discharge which tends to dry into crusts that may completely obstruct the nares and are difficult to remove. There is rarely ulceration of the soft tissues or necrosis of the bone, which distinguishes it from syphilis or lupus. It must be differentiated from foreign body in the nose and rhinolith which are usually unilateral, though cases of unilateral ozæna are not exceptional, one appearing in my series. It is much more commonly found in females than in males and usually appears between the 8th to 20th year. In this series, out of 21 cases, 15 were in females, and in all the symptoms first occurred between the ages of 8 to 20 years.

The mucous membranes of the nose in the early cases may have a glairy appearance, later becoming pale and dry. Early atrophy is noted, especially over the inferior and middle turbinates. S. L. Ruskin[3] differentiates between atrophic rhinitis and ozæna, histologically. The former he states to be a chronic inflammatory condition characterized by a loss of the columnar cells and their cilia. A lymphocytic invasion of the tissues is to be seen, chiefly marked in the turbinal regions, and there is little or no fibrosis or vascular change. On the other hand, ozæna shows degeneration of the epithelium with lymphocytic infiltration, and there are dense areas of fibrous tissue underlying. The secretory cells manifest early degenerative changes and the arterioles definite thickening and fibrosis, the picture here being one of tissue fibrosis due to loss of proper blood supply, which ultimately leads to resorption of bone.

The etiology of ozæna is still an open question, and probably several factors enter into it. Fereri and Parola,[4] in a radiological study of 100 cases of ozæna, found the maxillary sinuses normal in 64 and the frontal sinuses with arrested development in 36 and 19 normal; the ethmoids with increased transparency in 46. (Table I).

TABLE I.

	Increased transparency	*Decreased transparency*	*Arrested development*	*Absent*	*Normal*
Maxillary ...	7	3	3		64
Ethmoid	46	2			46
Frontal	14 (enlarged 16)		36		19
Sphenoids ...	6 (enlarged 2)	2			90

In our 19 cases where a radiological examination had been made, we find the frontals absent in 10 cases, arrested in 5, and normal in 4 only.

TABLE II.

	Increased transparency	*Decreased transparency*	*Arrested development*	*Absent*	*Normal*
Maxillary ...	7	11			2
Ethmoid	13	5			
Frontal			5	10	4
Sphenoid ...			7		5

At variance with other observers we found, radiologically, the maxillary antra with decreased transparency in 12 cases, and normal or with increased transparency in 8.

Likewise, in these cases with arrested or absent sinus development other pathological conditions are found in the skull. There is unusual bony thickening throughout. The teeth on the whole are excellent and show an excess of calcium deposit, and, in some cases, non-eruption. According to Dr. Mortimer, of the Biochemical Department of McGill University, this gives a picture of hypopituitarism and its effect upon bone development. Various text-books state that it is usually seen in anæmic and ill-nourished persons, but in my experience the reverse has been found, the majority appearing rather robust and in otherwise good health.

The cause of the fœtor is not definitely known, but Frese states that it is produced by bacteria which are associated with protein putrefaction, and he demonstrated in crusts taken from these patients, skatol, phenol, indol, hydrogen sulphide and volatile fatty acids.

Careful hygienic measures are of course important, such as adequate exercise and rest, daily bathing, regulation of the bowels, avoidance of dust and tobacco, and constitutional treatment when indicated.

Careful removal of the crusts, followed by washes or sprays and the application of a stimulating pigment such as Mandel's has been generally used and gives temporary relief. Endocrine gland treatments, vaccines, large doses of salicylates, implantations of the parotid duct into the nose, the use of scarlet red tampons with ichthyol and glycerin, have all been tried. By any one or other of these methods palliation of symptoms may be attained, but the condition tends to relapse after the treatment is suspended.

The technique of radium treatment, as outlined by Hubert and Robinson, is as follows. Twenty mg. of radium, screened with 0.2 mm. of platinum, and encased in a brass tube with a wall thickness of 1 mm., were applied to the lateral wall of each side of the nose for 40 minutes. Subsequently, an erythema dose was given; two 50 mg. radium tubes with the same screening were applied for one hour to each side of the nose. Within a week after treatment a reaction was observed, simulating an acute rhinitis. By the end of three weeks this would subside, leaving the mucosa more healthy, with a marked decrease in scab formation and with a diminution of the fœtor.

In the present series of cases a check-up has been made in each case to eliminate frank accessory sinus disease and lues.

The treatment is now started with a 50 mg. radium tube, screened with brass, and applied for two hours to each side of the nose on alternate days. In the milder cases this has been found sufficient. Before applying the tubes the nares are thoroughly cleansed of crusts and secretion, and then packed for 15 minutes with a 2 per cent solution of nupercaine and adrenalin. This packing is then removed and the floor of the nostril, to the posterior choana, is firmly packed with absorbent cotton. The tube is then inserted into the middle meatus, well back, and packed against the lateral wall for two hours. The patient is given Seiler's tablets and instructed to thoroughly cleanse the nose three times daily by snuffing the solution.

For the first month the patients report twice weekly to the clinic for observation and cleansing of the nostrils. If at the end of two months any fœtor remains a second application of radium is given, but this time the tube is tucked well back towards the sphenoid and remains *in situ* from one to two hours according to the amount of crusting observed. In only two cases has a third or fourth application been necessary. In every case so treated there has been a complete disappearance of fœtor; in a few, complete disappearance of the crusts; in the severer cases, small dry inoffensive crusting persisted. These latter cases were those with the very marked atrophic changes and wide open airways, and in which the patients were unable to expel secretions by blowing the nose. To obviate this we determined to reduce the airway by using cartilaginous grafts taken from a rib and inserted under the muco-periosteum of the septal wall. This has been done by Dr. MacNaughton in 3 cases, and two further cases are at present ear-marked for the same treatment. This operation requires approximately one week of hospitalization.

The follow-up treatment is simple. Instructions are given for the use of the Seiler's wash once or twice daily. A few of the patients use it less frequently. They report back to the clinic at first once weekly, then once monthly. In the severer cases, where dry crusting persisted, Mandel's pigment was applied to the mucosa once or twice a month.

In this series of cases so treated no untoward symptom, such as ulceration, bone or cartilaginous necrosis, has been noted, nor ill effect on the general health, or on vision.

Hubert and Robinson believe that the effect of the radium is due to a fibrosing effect on the submucosa, rather than a stimulating action to the atrophic mucous membrane, as suggested by Vasilia and Yoel. Again, it may be partially due to a lethal effect upon bacterial and fungoid growth.

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AVERTIN IN THYROID SURGERY: SIXTY CONSECUTIVE CASES*

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THE volume of the literature on any subject may be taken as a measure of the interest in that subject; the quality of this literature, however, will determine its true worth. This is well illustrated in the rise to popularity of avertin. In 1930-31 a large number of articles appeared all over the world dealing with avertin fluid, the new form of the drug which had replaced the unstable powder which had been used immediately following its discovery in 1926-27. This experimental period had been marked by many alarming reactions and at least 12 deaths, but so satisfactory was the new solution that every worker who had used it more than a few times seemed impelled to record his findings. During this time, there appeared in 5 of the leading journals, 46 articles discussing avertin, in 4,000 administrations. In only 13 were these observations based on individual series of 100 cases or more. With few exceptions, these reports included all manner of operation, dosage and technique. Details of this review were contained in a paper which it was my privilege to present, before this Section, in April, 1932—a paper which, quite frankly, belonged with these others in the category of quantity rather than quality. These early reports served their purpose in directing attention to the drug, but they are now being replaced by more scientific observations of certain specific phases of its use. The exact extent of its usefulness could only be determined by feeling one's way—using it more frequently in some operations and discarding it in others where the disadvantages proved greater than the advantages. Therefore, today's literature has undergone a change. The small series is being replaced by the large; the heterogeneous mass of information is being sifted down, to deal in detail with the drug in its most valuable applications. Thus a review of the same five journals showed a different picture for the period 1932-33-34: 37 authors now give data on over 13,600 administrations. Only four writers showed dissatisfaction, and their experience was limited to 43 cases, as distinct from the 13,627 cases of the remaining observers, whose general conclusions ranged from reasonable satisfaction to actual enthusiasm. Twenty-seven reported series of over 100 each and five over 1,000. Perhaps the best proof that avertin has taken its place as a recognized anæsthetic agent is the casual way in which it was mentioned in paper after paper dealing with general subjects. Thus, in addition to the above detailed reports, reference to it was found fifty-two times as an alternative to other methods. Again, the only disapproval came from five writers, who admitted little actual experience. Most of the remaining 47 classed it as excellent or very satisfactory, in certain fields. Avertin is no longer a curiosity; it is an accepted drug, to be considered in deciding on an anæsthetic procedure.

Surprisingly little mention was made of its value in goitre work, although any references found were enthusiastic. Seventeen authors gave details of a total of 139 thyroidectomies—the largest series being 40. A series of 100, published in 1931, was the largest we found, although the unrecorded cases must reach an impressive total. A complete search of the literature is practically impossible. These five journals were chosen because they carry a great deal of data on anæsthesia. As the 135 articles found in the past 5 years included both original papers and abstracts from many countries this review must be considered a very fair cross-section of world opinion.

We have come to look upon avertin as of pre-eminent value in thyroid surgery. For the past three years the anæsthetic of choice for thyroidectomy, in the wards of St. Michael's Hospital, has been avertin plus nitrous oxide and oxygen. The cases under consideration here were entirely unselected. Patients were assigned by the intern to any available anæsthetist; no good cases were sought, no bad cases were avoided. The present group comprises the first 60 to fall to my lot. It represents less than one-third of the thyroidectomies performed under

* Read before the Section of Anæsthesia, Academy of Medicine, Toronto, January 21, 1935.

avertin by Dr. Harold G. Armstrong, but since it is difficult to correlate the observations of different workers it was thought most useful to analyze the results only of the cases in which Dr. Armstrong himself performed the operation, and I, personally, administered the anæsthetic. A series of 60 consecutive operations of the same type, by the same surgeon and the same anæsthetist, presents an unusual opportunity of appraising the drug, since the standardization of technique will have eliminated practically all of the factors of variation except those directly attributable to the patient or the avertin.

This paper is predicated on the assumption that the surgeon desires a general anæsthetic. It is quite possible that a more widespread knowledge of avertin may lead to a revision of opinion as to the beneficence of local anæsthesia in hyperthyroidism, but the place for such a debate is not here. Safety presupposes the use of nitrous oxide or ethylene or, possibly, cyclopropane—certainly not ether. Ether is almost universally condemned by surgeons of wide experience. Not even a trace of ether was added to the nitrous oxide, following avertin, in the present series. This can, of course, be duplicated with other sedatives, but only in doses which leave these drugs open to more criticism than is avertin. To compare it with morphine and hyoscine (or nembutal, in moderate dosage) is to grant avertin's superiority—for the patient, in comfort of induction and recovery; for the surgeon, in ease of operation; for the anæsthetist, in simplicity of administration of the supplemental gas. It is hoped that our results will show that these great advantages are available with no sacrifice of safety.

The technique of administration has been described many times and is well standardized. An enema was given at bedtime, but none in the morning. All received Lugol's solution, by rectum, immediately after return to bed; it was as well retained as after any other anæsthetic. Intravenous saline or glucose followed each operation. The onset of sleep was uniformly calm and peaceful. Even the most toxic patients showed no excitement whatever. The patients were invariably enthusiastic. When administered in bed avertin ensured unconsciousness before the patient left her room, and the prolonged action gave a restful sleep, extending well into the evening. Many, who answered questions rationally a few hours after operation, stated the next day that they had no recollection of the conversation or the apparent distress in which they had seemed to be. Thus, avertin frequently, but by no means always, obliterated the worst twenty-four hours of the patient's ordeal. Private and acutely toxic patients received the avertin in bed. To the majority however, it was given in a separate anæsthetic room, on the operating floor. About three minutes after injection a period of increasing drowsiness and lassitude commenced, accompanied by rambling talk which became more and more incoherent. In one-quarter of the cases this was at its height in five minutes; in one-half, at from 7 to 10 minutes. This passed into a light sleep which was reached in two-thirds of the cases in fifteen minutes. Only four resisted sleep as long as thirty minutes and they were in no way troublesome. It was a sleep closely resembling the normal, from which they could, at first, be aroused by shaking. When left alone, there was a slowing of respiration, with a slight duskiness of the skin and a fall in blood pressure of about 15 points. When not moved to the operating table too soon sleep deepened to an actual snore. This was seen in two-thirds of cases at the end of eighteen minutes, and all but a few of the most resistent were snoring loudly at twenty-five minutes. They were then transferred to the table and the skin preparation commenced—in one-quarter of the cases at twenty minutes after injection, and in all except eight, at twenty-five minutes. Practically all the patients roused somewhat and moved around on the table, but within two minutes half of them had subsided, to allow preparation and draping without gas. Of these, thirteen (almost one-quarter of the total) tolerated an airway and the jaw was sufficiently relaxed to have allowed the introduction of an intratracheal catheter, had this been desired. The intratracheal method was not used in this series, as it was felt that any post-operative hoarseness or bronchitis might, wrongfully, be laid at our door. In general surgery, as a preliminary to intratracheal gas we have found avertin by far the most satisfactory form of pre-medication. It is then wise to leave the patient entirely undisturbed for full thirty minutes, after which, in many instances, the catheter can be introduced and the anæsthetic continued without ether. During preparation, the other half of our patients, while entirely unconscious, squirmed

and moved on the table, and it was advisable to start the gas. This allowed the incision to be made, in three-quarters of the cases, before thirty minutes from the start of injection. In only eight was it delayed as long as thirty-five minutes. Even rigid operating schedules may be adhered to by commencing the injection one-half hour before the time of actual operating.

The patients were held where desired—in the plane of basal anæsthesia. In one case only was the incision possible without gas, and here morphine had been given. Full operating anæsthesia we look upon as potentially of great danger and under no circumstances did we aim to obtain it. Only four writers attempted full anæsthesia, using doses much in excess of ours, and sedatives, which we avoided. A number of workers actually obtained complete anæsthesia —usually with the help of morphine—in as high as 30 per cent of their general surgical cases, but they looked upon this as accidental rather than desirable.

The course of the gas anæsthesia was so smooth as to abolish much of the work and worry so often associated with thyroidectomies. This was due to the amazingly high percentage of oxygen which was tolerated, a point frequently commented upon in the literature, but not granted the attention it deserves. It seems to us to be the cardinal point in avertin's safety, for any sedative which allows perfect working conditions with a mixture of 40 per cent oxygen and 60 per cent nitrous oxide has so simplified gas anæsthesia as to greatly widen its range of usefulness. We adopted a standard procedure, which ensured safety to the patient by a maximum oxygen intake, with no interference with the surgeon. The induction was carried out as usual and the patient stabilized at a satisfactory level—almost always while the skin was being prepared. In 79 per cent of cases induction was possible with 20 per cent of oxygen, and in no case was the oxygen reduced below 10 per cent. The patient was carried for five to ten minutes on this mixture and then an additional 5 per cent of oxygen added. This was repeated every five minutes until he became light—usually somewhere between 50 and 70 per cent oxygen. Lightness was very much easier to control than with other sedatives. Vomiting was not encountered, even when the patient was lightened to allow phonation, when desired by the surgeon. A mixture of 70 per cent oxygen naturally presented no difficulty. That level was held in one-third of all cases for periods of from ten to 40 minutes and two thirds of all cases were satisfactory, for similar times, on 60 per cent oxygen. In only four cases was it necessary to give less than 35 per cent oxygen for more than a minute or so. Adjustments in the gases were made in fives or tens, not single points. The safety of this was particularly notable in operations to relieve pressure on the trachea. During the trying moments while the gland was being freed respirations were frequently so interfered with as to be mere gasps. With ordinary sedatives and a mixture of even 15 to 18 per cent oxygen cyanosis would have been difficult to avoid, since additional oxygen would have upset the anæsthetic balance, with straining and coughing. With avertin the gasping respirations also occurred, but a gasp of a mixture containing 60 per cent oxygen proved very different from a gasp of a 15 per cent mixture, and no anoxæmia developed. Eighteen cases were of this obstructive type—14 toxic and 4 non-toxic. We feel certain that, had it not been for the very high oxygen intake, several of these operations could not have been successfully completed in the face of existing obstruction. The highest possible percentage of oxygen gives the patient just that much greater margin of safety, despite the fact that he may appear quite satisfactory on about 25 per cent oxygen—a concentration which was reached in every case, with ease. The old theory of harm following excessive oxygen has, we think, been abandoned. Is not the great point about cyclopropane the fact that anæsthesia is possible in the presence of 85 per cent oxygen? That performance can be equalled, or at least approached, with most thyroids with avertin and nitrous oxide, at much less cost and with proved safety. Increase of the oxygen by 5 per cent every five minutes was found much more satisfactory than an immediate elevation to about 45 per cent, with an attempt to hold it there unchanged.

This technique has reference to gas administration by the method of pressure and partial re-breathing. Our experience with the new carbon dioxide absorption apparatus has been too limited to show whether or not with it avertin will be as advantageous as with the old. For the anæsthetist who may be without a new machine or the hospital which is so short-sighted as to refuse the new money-saving equipment,

the combination of avertin and nitrous oxide under pressure will remain of great value. The saving in gas does not approach that with the absorption method, but is substantial enough to more than equal the cost of the avertin, since the average of all gases was around 50-50, and that mixture is much cheaper than the more usual average of, probably, 15-85.

To attain consistently these results it is necessary to use full doses and to leave the patient undisturbed for at least twenty minutes, starting the gas not sooner than twenty-five minutes from injection. A longer wait will ensure more satisfactory results; a shorter one will seldom show avertin at its best. The dose will vary with the effect desired, but here the normal dose must be considered 100 mg. per kilo of body weight. All patients received this amount except three. One, weighing 195, of the obese type which stands avertin poorly, received 90 mg. The result was excellent. One bad risk, with a very large gland, received 80 mg. and was definitely too light. One had had morphine, gr. 1/8, and was given only 80 mg. The result with the reduced dose and very small amount of morphine was satisfactory. This maximum of 100 mg. was set by one-half of the writers. The other half recommended either more or less, but aimed at different levels of anæsthesia. With smaller doses, morphine was usually advised; with larger, recommended as good practice by only four writers, morphine was sometimes used, but, in many cases, complete anæsthesia was being sought. Indications of dosage in thyroidectomies are not necessarily the same as in other operations. We had no bad results, in this series with 100 mg., but we would have hesitated to use that amount in many cases, had the condition been other than toxic. We agree with the general opinion that goitre patients tolerate bigger doses than any other type. The majority of such patients will be toxic and will stand the full dose well; the others will be suffering from pressure symptoms, and the large dose will give the greater depth necessary to attain the high oxygen percentage described.

Sex and age had much less influence on dosage than had the general condition. Females predominated, by 3 to 1. More than half were between 20 and 40 years of age. The youngest was 15; the oldest was 59, with 9 over 50 years; all did well. The hyperthyroidism was complicated in a number of cases by old tuberculosis, many types of heart lesion, mild bronchiectasis, and menopausal upsets; one patient was insane and one deaf and dumb. In these latter cases, the smooth onset was particularly beneficial. In type, 45 were toxic and 15 non-toxic. One-quarter of the total showed definite pressure symptoms combined with toxicity, and it was in these that the excess of oxygen was the greatest boon. The basal metabolic readings were a definite guide to dosage, being surprisingly accurate, when checked against the clinical signs and later pathological reports. All with readings over 115 proved to be toxic; all under 105, non-toxic. The range of error lay from 105 to 115, where 9 were toxic and 7 non-toxic. It is doubtful if even the very toxic should receive more than 100 mg. Rather than exceed that amount, it is preferable to leave the patient quiet for an extra 10 minutes, thereby obtaining a maximum effect from a safe dose. This is also the correct alternative to the use of morphine.

One hundred mg. alone, if given time to act, will give results far more constant than will a small dose reinforced with morphine. This condemnation of morphine is not based on the present series, where it was used only twice, but upon observations of its use in other thyroids and in general surgery. Practically the only alarming depressions (of central origin) which we have seen have been in those cases where morphine had been given. Despite this, the majority of writers, who mention it at all, suggest its use. The association of morphine with the avertin in the fatalities reported is much too constant to be ignored. In the three-year survey 9 deaths were found, previously unreported, in which avertin was incriminated, although the authors usually presented evidence to back the opinion that other factors were of equal importance. One report gave no data as to dose or sedative. In every other case, however, the dose was 100 or 110 mg., and, in every instance, morphine had been combined with it. To us this seems much more significant than other circumstances noted. In the case of most deaths avertin was accompanied by ether, ethylene, nitrous oxide or other drugs which have, themselves, at times proved fatal. Morphine is particularly harmful where there is obstruction to the airway. There were no deaths in this series, and the one alarming reaction was due to obstruction, on return to bed. This man had a deformity in which

the head, neck and thoracic spine were fixed and moved as a unit. During transfer to bed, following a difficult but successful operation, he was allowed to slump down into such a position as to shut off the airway, with almost fatal asphyxia. Change of position caused immediate improvement, and with intravenous saline, containing 5 c.c. coramine, he roused and spoke incoherently in about twenty minutes. For thirty-six hours marked heart symptoms persisted, but eventual recovery was excellent. It was not the effect of avertin on a bad heart or respiratory centre that caused the trouble; it was asphyxia, due to mechanical obstruction. This danger is undoubtedly a grave drawback to the method, but one which can be met in any well organized hospital. Free respiration must be maintained at all times. Even when no nitrous oxide is needed breathing should be forced with a closed mask and oxygen or carbon dioxide.

The importance of obstruction may be emphasized by consideration of the only other bad cases, in the entire hospital experience. There were two deaths which the surgeons blamed upon avertin, but which I personally witnessed and believe, from a knowledge of all the circumstances, to have been due to other causes. This is, of course, the qualification which accompanies almost every report, and it is this seeking of loop-holes, however justified, which makes the task of analyzing anæsthetic deaths extremely difficult. The first operation was for excision of the tongue for carcinoma. The patient had received morphine, gr. ¼, and the avertin was reduced to 90 mg., part of which was expelled. The total dose was quite small, but, note again the association with morphine. The avertin effect was unsatisfactory, and instead of the straight intratracheal gas we had hoped for, almost full ether was required. Obstruction of the airway by operative interference was a recurring feature throughout, and it was frequently persisted in, to a point of near-asphyxia. Had the morphine been omitted and a dose of 100 mg. given, it is quite possible that we could have carried him safely on the high oxygen percentage described. Shock on the table was due to obstruction and not to central depression. One hour later his condition was fairly good. Although still unconscious, respirations were regular, of good volume, and 26 to the minute—certainly not avertin depression. Half an hour after that observation he was dead, according to our belief, from myocardial failure, following normal operative shock plus the strain imposed by repeated periods of obstruction. The other was a toxic goitre, with a tremendous degree of pressure (not included in this series, as she was on a different surgical service). She died one hour after the completion of the operation. Here again the surgeon blamed avertin but her previous condition and autopsy findings go far to support our contention that a fatal outcome would have been just as probable with any other procedure. This woman was 37 years of age, of the obese type, weighing 180 lbs. Three months before admission she had started to show rapidly increasing toxicity and heart signs, accompanied by great dyspnœa and marked cyanosis of the upper half of the chest and face. In hospital for 17 days, her condition became rapidly worse, with a basal rate of 139, pulse 110, temperature up to 101° at times, both lungs full of râles, liver enlarged 1½ inches below the costal margin, marked œdema of the legs, and terrific dyspnœa and cyanosis, due both to the heart action and the size of the gland, which pushed the trachea aside to an angle of twenty degrees. The colour of the face for several days before operation could only be compared to a patient on a mixture of 95 per cent nitrous oxide. It would be hard to imagine a worse risk. She received 90 mg. only. Sleep ensued in nine minutes and oxygen was started at once, together with a routine intravenous saline. No nitrous oxide was needed at any stage, but despite 100 per cent oxygen, her colour showed practically no improvement. Respirations were not depressed, and until traction on the gland became troublesome remained as good as previously. For twenty-five minutes during the freeing and removal of the gland she breathed only in gasps, due to traction, not central depression, for in the intervals of release of pressure, respirations were quite good, and, following removal of the gland, there was some slight improvement in colour. The pulse rose from 110 to 130 and the blood pressure held throughout around 100 to 105. The operation was satisfactorily completed in one hour and forty-five minutes, and she returned to bed in very definite shock, deeply unconscious, and receiving a steady flow of oxygen. Following the movement, respiration suddenly became gasping. An intratracheal catheter was introduced, but,

despite continuous intratracheal oxygen, intravenous coramine and ephedrine, she died in a few minutes. There was no paralysis of the vocal cords, and no hæmorrhage into the wound to cause collapse of the trachea. The respiratory change was not a steadily deepening process of central depression, but a sudden change due to cardiac collapse. Autopsy showed advanced degeneration of the myocardium. The trachea and bronchi were filled with a large volume of fluid blood; this apparently had come from a great many areas of mucosal hæmorrhage, which studded the walls of the trachea and bronchi. There was no trauma to the trachea, either by operation or catheter. Each pleural cavity contained 300 c.c. of clear fluid. By no stretch of the imagination could these findings have arisen following the absorption of the avertin two and one-half hours previously. We see no reason why avertin, here, should be considered anything beyond a contributory factor in an almost inevitable death. These details of the only fatalities in four years will allow anyone to appraise the drug according to his own standards.

That avertin kills by action on the respiratory centre, primarily, has been well demonstrated in animal experiments. Further proof concerning its relatively slight effect on the heart was found in an analysis of the existing cardiac complications here. Where there was no interference with respirations, either by depression or mechanical obstruction, even severely damaged hearts showed little obvious strain. In all cases, the blood pressure fell at least 15 points with the onset of sleep, with little change in the pulse. This fall must have been respiratory in origin, since any stimulation to deeper breathing caused a rise. In only two cases did the pressure fail to rise with the fuller respirations accompanying the start of the gas. The lowest readings were found, not at the end of operation when the heart is usually most taxed, but in undisturbed sleep. The greatest drops were 50 points in 3 cases; 40 in 1, and 30 in 8. All other patients showed falls of 20 points or less, and all, except two of the entire series, finished with a blood pressure at or above the initial reading. Fifty-two hearts were checked by electrocardiograms. Twenty showed moderate or severe myocardial damage and of these 25 per cent showed a fall of more than 20 points. Thirty-two had normal readings, yet of these, 34 per cent showed the 20 point drop. This indicates little direct action on the heart, even when severely damaged, and is an interesting commentary on other clinical and experimental work.

Avertin is a drug which improves on acquaintance. Most of the writers who hailed it as a real asset quoted accidents or individual cases where it was unsatisfactory. In this, it does not differ from other anæsthetic agents. Can anyone honestly say that he has seen no deaths with nitrous oxide or ether, no complications with spinal anæsthesia, no alarming or fatal depression with morphine, amytal, or nembutal? Of course not. There is no drug in anæsthesia which is safe unless handled with judgment. Avertin, because of its potency, requires its user to serve an apprenticeship until such time as he becomes familiar with the vagaries of its action. There is no place in avertin anæsthesia for hit and miss methods. Experience has shown certain hard and fast rules which must not be transgressed. If the anæsthetist is not prepared to abide by these principles, if he is not ready to adjust his ideas and routine to these fundamentals, then let him leave avertin in safer hands. Guesswork means disaster for the patient, and odium for a valuable drug. Reasonable care and attention to detail brings to anæsthetist and patient alike a degree of comfort not often equalled by methods of longer standing.

AIR EMBOLISM.—K. Nemec (*Klin. Woch.*, Jan. 12, 1935, p. 55) points out that the danger of air embolism after intravenous injections is greatly overestimated. To persuade himself of this he commenced by slowly injecting 2, 3, 4, and 5 c.c. of air into himself. As he experienced not the slightest symptom, he rapidly injected himself with 5 c.c. of air, and controlled his heart rate with the stethoscope. Again he was unable to note any subjective or objective symptoms. He then injected 10 c.c. of air rapidly on two occasions, and on one he experienced a very slight feeling of oppression for one and a half minutes after the insufflation, and increase of the pulse rate from 74 to 85 per minute for ten minutes. He infers that this might have been due to a rudimentary embolism, but believes that it was more probably due to nervous tension. It has been shown that 22 litres of air may be pumped into the jugular vein of a horse without producing air embolism and death. Death is due to a large air bubble entering the heart. Small bubbles may pass through the heart and lungs without giving rise to symptoms. In the blood vessels of the brain they may cause disturbances several hours later. Nemec believes that provided the heart is healthily active, artificial respiration will save most cases of air embolism occurring during operation, and that the insufflation of air up to 10 c.c. during intravenous injection is quite harmless.—Abs. in *Brit. M. J.*

MULTIPLE INTRACRANIAL ANEURYSMS*

By WILLIAM MAGNER,

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G.H., male, aged thirty-five, was admitted to St. Joseph's Hospital, Toronto, on February 16, 1935. His *history* was as follows. Fifteen years previously he had fallen a distance of thirty feet, striking the right side of his head. Following this injury he complained of a continuous dull ache over the vault of his skull. Eight years later he had had an illness which was characterized by the sudden onset of dizziness, ptosis of the right eyelid, blindness in the right eye, deafness in the right ear, and paralysis of the left arm and left leg. He slowly recovered from the paralysis, but the ptosis, blindness and deafness persisted. About two years after this attack the headache, which had been almost constantly present since his accident, became more severe, and for some months before his admission to hospital it had been gradually increasing in intensity. For three weeks he had been very irritable. At times his speech was wild and nonsensical, and he laughed uproariously without obvious cause. Four days before his admission he became weak while in the Township Relief Office and was unable to reach his home without assistance. On the next day it was noted that he had lost the power of speech, was paralyzed in the left arm and left leg, and was unable to urinate. At the same time he suffered from nausea and vomiting. He was seen by a physician who advised his removal to hospital.

Examination showed that he had motor aphasia. Apparently he understood what was said to him but was unable to form words other than monosyllables. He was emotional and his mental reactions were slow. A large, irregularly-shaped, firm swelling was present in the right parietal region at the site of his old injury. He had slight ptosis of the right eyelid. He was completely blind in the right eye and had temporal hemianopsia on the left side. Ophthalmoscopic examination showed bilateral optic atrophy. He was deaf in the right ear. His left arm and leg were paralyzed, and there appeared to be some weakness of the lower facial muscles on the left side. Exaggerated tendon reflexes, patellar and ankle clonus, and a positive Babinski's sign were present on the paralyzed side. The Wassermann and Kahn reactions were negative. Radiological examination of his skull showed a mass in the pituitary fossa. The bony structures in this region were eroded and the anterior and posterior clinoid processes had disappeared. The mass was surrounded by a ring of calcareous deposits. A diagnosis of supra-sellar cyst was made, and the patient was transferred to St. Michael's Hospital for operation.

Operation.—On March 6th a right frontal osteoplastic craniotomy was done. The frontal lobe was dislocated upwards and a yellow, firm, non-pulsating tumour was found in the sella. On attempting to extirpate this mass its wall was broken and severe arterial bleeding occurred. An unsuccessful attempt was made to control the hæmorrhage by packing and the insertion of a muscle graft, and the patient was given three blood transfusions. Death, however, occurred within a few hours.

Post-mortem examination was limited to the skull. The brain was very œdematous and the inferior surface of the right frontal lobe was extensively lacerated, apparently by operative trauma. On the base of the brain were two large saccular aneurysms. One, situated on the right internal carotid artery, formed a mass measuring 3 x 3 x 2.5 cm. This had eroded through the posterior portion of the sella, and it was necessary to chisel through the bony tissue to remove the specimen. The wall of this aneurysm was extensively calcified and lined on its inner surface by a thick layer of laminated thrombus. A portion of the outer fibrous layer of the wall, measuring about 1 x 1 cm., had been removed at operation, exposing the inner layer of blood clot. A second aneurysm was situated on the mid-portion of the basilar artery. This measured 3 x 2.5 x 2.5 cm. and, like the carotid aneurysm, its wall showed extensive calcification and a thick inner layer of laminated thrombus. The basilar artery, proximal and distal to the aneurysm, was thick-walled and dilated, and at the point of bifurcation there was a third aneurysmal dilatation measuring 1.25 x 1 x 0.75 cm. Microscopical examination of the walls of the two larger aneurysms showed dense fibrous tissue containing numerous calcareous deposits, but no evidence of syphilitic inflammation. The pons and peduncles were flattened by pressure from the underlying basilar aneurysm. The lateral ventricles were dilated and filled with fresh blood clot which extended into the third and fourth ventricles. In the right frontal lobe there was an area of hæmorrhagic softening which measured about 1 x 0.75 cm. and extended from the lacerated inferior surface of the lobe upwards for a distance of three cm. This intra-ventricular and frontal lobe hæmorrhage was doubtless due to operative trauma.

DISCUSSION

Intracranial aneurysms, that is, true macroscopic dilatations of one or other of the intracranial arteries, are not very rare. Pitt found 23 in 9,000 autopsies, Conway 43 in 6,325, Fernsides 55 in 5,432, Osler 12 in 800, Sossman 8 in 581, Szekely[1] 157 in 11,500, and Turnbull[2] 40 in 5,000. Grouping these figures together, it appears that 338 intracranial aneurysms were found in 38,638 autopsies, an incidence of 0.87 per cent.

The middle cerebral, the basilar, and the internal carotid arteries are those most commonly affected. In 86 cases studied by Peacock the aneurysms were situated as follows: 27 on the middle cerebral and its branches; 22 on the basilar; 12 on the internal carotids; 6 on the posterior cerebrals; 5 on the anterior communicating; 4 on the anterior cerebrals; and 3 on the cerebellar arteries. One was an anteriovenous aneursym, and in one case there were multiple small aneurysms. In Schmidt's[3] material there were 26 aneurysms in 23 subjects, 2 being found in one case and 3 in another. Seven of these were on the middle cerebral; 7

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on the internal carotids; 5 on the basilar; 2 on the anterior cerebral; 2 on the posterior communicating; 2 on the ophthalmic, and 1 on the anterior communicating.

Intracranial aneurysms appear to occur more frequently in women than in men. Hoffman found 51 in females and 22 in males. In Schmidt's cases 17 were women and 6 men, and 65 per cent of Szekely's cases were women. Fernsides and Osler, however, found that cases in males slightly outnumbered those in females.

Intracranial aneurysms have been found at all ages from 11 to 75, but most commonly in subjects between forty and sixty. Of 58 cases analyzed by Gull, 12 were under twenty-five, 13 between twenty-five and forty, 29 between forty and sixty, and 4 over sixty.

The aneurysms vary greatly in size. Many of them are described as being just visible to the naked eye, others as being the size of a pea, a cherry, a walnut or a plum. Schmidt reports one almost the size of a chicken's egg, and refers to a case of Reinhardt's in which the mass was the size of a fist. It would appear from published reports that intracranial aneurysms are usually less than one centimetre in size, that those over two centimetres in diameter are rare, and that the occurrence of multiple aneurysms of the size here reported is to be regarded as a pathological curiosity. Shore,[4] writing in 1928, reported a case in which a woman who died with symptoms of meningovascular syphilis, but with no signs of intracranial aneurysm or tumour, showed at autopsy, in addition to syphilitic lesions in the brain and aorta, multiple intracranial aneurysms. One was situated on the right internal carotid and measured 1.5 x 1.2 x 1.2 cm.; another on the left carotid measured 2 x 1.7 x 1.2 cm.; a third, on the basilar artery, was 2.5 x 2 x 1.5 cm. in size; and a fourth, also on the basilar at its point of bifurcation, measured 2 x 1.8 x 1.2 cm. This writer was able to find only one comparable case in the literature. This was reported by Bourneville, whose patient had aneurysms of the right vertebral, anterior cerebellar, and right and left posterior communicating arteries, measuring 1 x 0.6 cm., 0.7 x 0.6 cm., 0.6 x 0.4 cm. and 1 x 0.8 cm., respectively. It will be noted that the aneurysms in the case under discussion were considerably larger than in either Shore's or Bourneville's case.

In discussing the etiology of intracranial aneurysms the following factors must be considered: arteriosclerosis, syphilis, embolism, trauma, and congenital weakness of the arterial wall. It is generally agreed that arteriosclerosis is a common cause of these aneurysms, although, as pointed out by Schmidt, it is difficult to decide whether an aneurysm is due to arteriosclerosis or whether there is merely arteriosclerotic degeneration of the wall of an existing aneurysm. In the case here reported, while the walls of the aneurysms and the basilar artery throughout its length were sclerotic, there was no evidence of sclerosis of the other intracranial arteries.

Syphilis appears to be relatively unimportant as an etiological agent, although syphilitic aneurysms do occur within the skull. In Shore's case autopsy showed syphilitic meningoencephalitis, syphilitic aortitis, and syphilitic inflammation of the wall of the basilar aneurysm. There are other reports dealing with syphilitic intracranial aneurysms, and the relatively high incidence of such aneurysms on the vertebral and basilar arteries has been stressed by several writers. In the case under discussion, however, there was no evidence of syphilis.

In many cases single or multiple small intracranial aneurysms have been attributed to the lodgement of infective emboli, usually liberated from the heart valves. These mycotic aneurysms are supposed to be due to inflammatory softening of the arterial wall. Church collected 13 such cases, all occurring in patients under twenty years of age; in 10 of these the aneurysms were situated on the arteries within the substance of the brain or on the communicating arteries of the circle of Willis. Wichern concluded that 5 of his 22 cases of intracranial aneurysm were embolic in origin, and Fernsides, that 15 of 44 cases which he examined were of similar nature.

The possibility of intracranial aneurysms developing as the result of injury to the skull must be entertained. Pawlowski[5] points out the existence of many irregularities about the clinoid processes of the sphenoid bone, the manner in which the vertebral and other arteries may be bruised by the edges or rims of bone openings or passages in which they lie, the strain put on

vessels when the head is injured and the brain jolted back and forth, and the pull made on vessels when the rounded contour at different places in the cranium is flattened or the cranial bones are broken. Reuterwall's observations might be interpreted as indicating the occurrence of traumatic injuries to the vessels in the skull, as in a routine study of the arteries at the base of the brain he found many scars resembling healed lacerations in their walls. However, the probability that such scars are due to the healing of inflammatory or degenerative lesions rather than of mechanical tears must be admitted. Kirby, Hedinger, Menschel and Stilling have published reports of cases in which an aneurysm developed following cranial injury, and in the present case there was a clear history of continuous cerebral symptoms from the date of injury until death ensued fifteen years later. In no such case, however, is it possible to prove a connection between the injury and the development of the aneurysm.

In many cases intracranial aneurysms occur in the absence of arteriosclerosis, syphilis, endocarditis, or a history of trauma. These are found often in young subjects, and their development has been attributed to the presence of congenitally weak areas in the vessel wall. Forbes found such defects in 25 of 31 apparently normal cerebral arteries, and Busse, confining his attention to the anterior communicating artery, found minute aneurysmal dilatations on this vessel in 39 of 400 autopsies. Schmidt quotes several other authors to the effect that developmental anomalies occur frequently in the vessels of the circle of Willis. Green[6] examined 19 cases presenting basal cerebral aneurysms and found that 5 of the aneurysms were of embolic origin and associated with malignant endocarditis; 2 were due to arteriosclerosis; and the remaining 12 were of the congenital type.

Beadles,[7] in 1907, analyzed 555 cases of cerebral aneurysms from the clinical aspect, and divided them into four groups. (1) In 257 cases, or 46.3 per cent, the first indication of a cerebral lesion was a fatal hæmorrhage due to rupture of the aneurysm. (2) In 115 cases, or 20.7 per cent, fatal hæmorrhage was preceded by symptoms which suggested the presence of an intracranial tumour or other cerebral lesion. (3) In 91 cases, or 16.39 per cent, the symptoms were those of cerebral tumour only. (4) in 92, or 16.61 per cent, there were no cerebral symptoms, and the aneurysm was discovered at autopsy. This writer believes that it is very rarely possible to make a clinical diagnosis of intracranial aneurysm, and that in the majority of such cases it is not even possible to make a diagnosis of cerebral tumour. With this opinion the majority of authors are in agreement. It is quite certain that small aneurysms do not cause symptoms until they rupture and produce the clinical picture of spontaneous subarachnoid hæmorrhage, and that this may also be true of quite large aneurysms is shown by autopsy records. In some cases, however, by correlating clinical and radiological evidence, the correct diagnosis has been reached.

I am indebted to Dr. V. McDonough and Dr. Ashenburst for the clinical notes of this case.

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O. O. Schuberth and G. Söderlund (*Nord. Med. Tidsskrift*, April 20, 1935, p. 601) review their experiences of 508 blood transfusions performed on 357 patients in a hospital in Stockholm since 1922. They always employed the indirect method because of the comparative simplicity of its technique, and to minimize the risk of infection and psychic shock. In most cases no chemical was added to prevent coagulation, the technique followed being that of the paraffin method of Brown-Percy. Among the few cases in which the blood was citrated there was a comparatively high proportion of accidents. Dispensing with citrates entails the avoidance of all shaking of the blood; injury to its red cells from the mechanical action of shaking is thus averted. In 20 cases the transfusion induced rigors or a sudden rise of temperature or shock; and though in most cases these accidents were transient, there were two in which the transfusion must be held responsible for death and two others in which the transfusion contributed to the fatal issue. These accidents were comparatively common among the transfusions from Group A to Group A. The accidents were least common when the donors belonged to Group O; and it would seem that transfusion from O to A is safer than from A to A. Accidents were comparatively rare when transfusions were given for acute conditions such as hæmorrhage, shock, and post-operative debility, and were most common when the patients had been ill for long—Abs. in *Brit. M. J.*

THE CELLULAR REACTION TO SILICA

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THE object of this research was to study the cellular reaction produced by the subcutaneous injection of finely particulate quartz into the ears of rabbits. The histopathological changes taking place in the subcutaneous tissue of the ears were followed at intervals ranging from ten minutes to nine months after the injections. Particular attention was paid to the different types of cells participating in this reaction. An attempt was made to determine their time of appearance, function, and ultimate fate.

Hand-picked quartz that had been reduced to a fine powder in a ball-mill was used. The particles varied in size from 0.5 to 25 μ. The great majority of the particles were less than 5 μ in the longest diameter. Weighed quantities of this material were added to distilled water so that each c.c. contained 40 or 60 mg. of the powder. The suspension was autoclaved for 30 minutes and injected under aseptic conditions. One-half c.c. of this suspension was injected subcutaneously into the external surface of the ears of 24 rabbits.

The material was injected with a 10 c.c. syringe and a 16 gauge needle at two widely separated sites in each ear. For histological examination of the effects, sections of the ear were punched out with a large cork-borer (12 mm.) placed in position so that the sites of injection were centrally located. In the early stages of the investigation the sections were taken for examination at daily intervals. The changes observed at the end of the first day were so marked that it was decided to repeat the work and to study the changes at ten-minute intervals for the first hour and at two-hourly intervals during the first day. The tissues were fixed in formalin, dehydrated in alcohols, imbedded and cut in paraffin. Serial sections were stained with hæmatoxylin and eosin and with cresyl violet. The siliceous material was demonstrated in adjoining sections by the technique of microincineration and subsequent treatment of the ash with hydrochloric acid.

MICROSCOPIC FINDINGS

The following histopathological changes were found in the sections taken at the various intervals designated below. The slides selected for description are representative of the tissue reaction at the different time intervals after the subcutaneous injection of quartz. The sections taken between these intervals show a gradual progression or regression of the changes described.

50 minutes.—Sections through the whole thickness of the ear show large, irregularly rounded masses of very loosely packed quartz particles in the areolar tissue on one side of the cartilage. In several foci, the masses are bordered by a thin layer of polymorphonuclear leucocytes, which have been drawn out into long spindle-shaped cells still retaining their eosinophilic granules and lobed nuclei. Numerous venules in the surrounding tissue contain polymorphonuclear leucocytes, which are marginating and passing through the walls by diapedesis. The areolar tissue, with its cells widely separated, leaving clear open spaces, for a considerable distance from the particulate matter is diffusely infiltrated by polymorphonuclear leucocytes.

6 hours.—Sections show compact masses of very finely particulate quartz containing large numbers of living and disintegrated polymorphonuclear leucocytes. The areolar tissue of the ear, containing the particulate mass, is diffusely infiltrated by polymorphonuclear and mononuclear leucocytes. An occasional lymphocyte is seen in these sections. The mononuclear leucocytes are fewer in number but as diffusely distributed in the tissues as the polymorphonuclear leucocytes. The venules of the areolar tissue contain great numbers of polymorphonuclear leucocytes and an occasional mononuclear leucocyte. (Fig. 1).

6 days.—Sections show large masses of very fine quartz particles containing numerous living and disintegrated mononuclear and polymorphonuclear leucocytes. The mononuclear leucocytes greatly outnumber the polymorphonuclear leucocytes. No particles of silica are visible in the cytoplasm of the mononuclear leucocytes. Small clumps of this finely particulate material are so extensively interspersed with cells and cell debris that the entire mass has the appearance of organization. The surrounding areolar tissue contains numerous polymorphonuclear leucocytes and mononuclear leucocytes. There is an active mobilization and proliferation of histiocytes around the blood-vessels and at the periphery of the masses of particles. These cells are very numerous in the areolar tissue, appearing as single amœboid cells, many of which are seen in mitotic division. (Fig. 2).

11 days.—These sections are similar to those described at 6 days, except that the changes are more pronounced. More mononuclear leucocytes and polymorphonuclear leucocytes are broken down within the masses of quartz particles. Sheets of histiocytes are seen forming around the particulate masses and extending into them in long thin strands from various sites

at their margins. Numerous newly formed, thin-walled blood-vessels appear in the areolar tissue. (Fig. 3).

3 weeks.—Sections show central compact masses of finely particulate quartz and cell debris surrounded by thick layers of histiocytes. Many of the histiocytes have engulfed the quartz particles and cellular debris. The histiocytes are advancing from the margins towards the central portions of the rounded masses of particulate material, completely engulfing it in many of the smaller foci. These cells are elongated and spindle-shaped at the outer margin of the particulate masses. As they advance into the masses and begin to engulf the quartz and cell debris they become distended and spherical in outline. These cells have granular vesicular nuclei with prominent nucleoli and pale, finely granular cytoplasm of a foamy appearance. Numbers of these cells, distended with foreign material, are grouped together and surrounded by sheets of closely packed spindle-shaped cells which have similar nuclei but clear cytoplasm. The surrounding areolar tissue contains numerous histiocytes in active mitotic division, and is infiltrated by polymorphonuclear and mononuclear leucocytes. The groups of phagocytic cells surrounded by layers of long spindle-shaped cells give an appearance of early nodule formation. (Figs. 4 and 5).

9 weeks.—These sections show a number of nodules in the areolar tissue of the ear. These vary in size from clumps of ten or twelve cells to areas covering two or three low power fields. Some of the nodules consist of a group of phagocytic cells which are elongated and tend to be arranged in whorls surrounded by layers of long spindle-shaped cells. Others have a similar appearance, except that the central portions consist of a rounded mass of finely granular cellular material. The nodules and surrounding tissue contain numerous very small thin-walled blood-vessels. There is a widespread infiltration of the nodules and surrounding tissue by polymorphonuclear and mononuclear leucocytes.

16 weeks.—Sections are similar to those described above, except that the phagocytic cells appear to be shrunken (leaving clear intercellular spaces) and transformed into fairly typical fibroblasts. There are numerous clear intercellular spaces between the fibroblasts. A large amount of collagenous material is seen in the intercellular spaces of the nodules and areolar tissue.

7 months.—Sections show a number of nodules composed of elongated spindle-shaped cells arranged in whorls. Many of these cells appear to be shrunken, leaving clear intercellular spaces. Large amounts of fibrous, collagenous material are seen in the intercellular

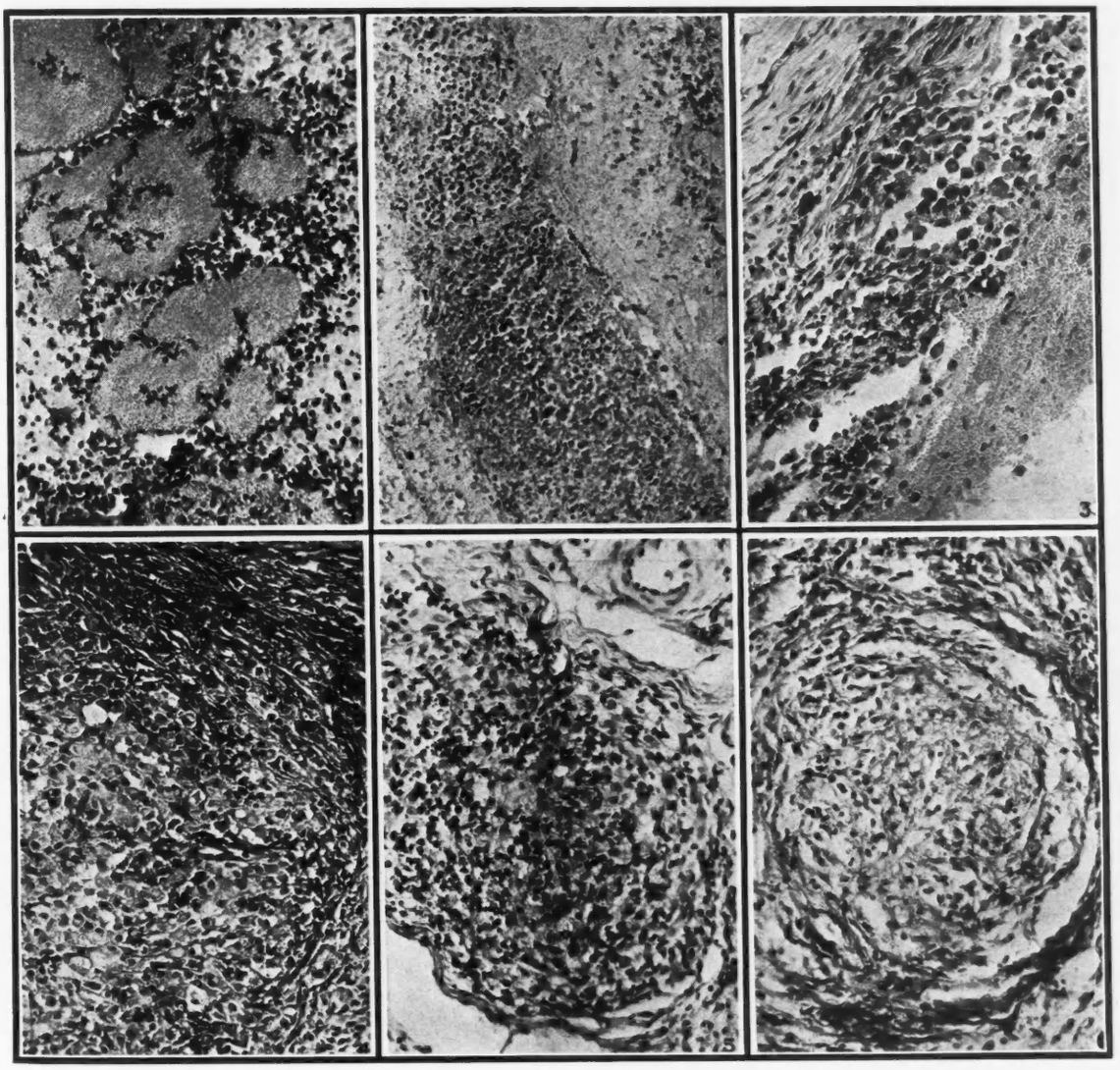

FIG. 1.—Silica—6 hours—acute inflammation. FIG. 2.—Silica—6 days—subacute inflammation. FIG. 3.—Silica—11 days—chronic inflammation. Histiocytes engulfing quartz particles. FIG. 4.—3 weeks—quartz particles and debris engulfed by phagocytes. FIG. 5.—3 weeks—early nodule formation. FIG. 6.—7 months—siliceous fibrotic nodule.

spaces of the nodules and surrounding tissue. The centres of some of the nodules appear as acellular masses of very finely granular material. This is the typical silicotic nodule. (Fig. 6).

DISCUSSION

The cellular reaction to the injection of finely particulate quartz into the ears of rabbits may be discussed under the headings of (1) acute, (2) subacute, (3) chronic inflammation, and (4) scar-tissue formation.

The sections taken at ten minute intervals during the first sixty minutes showed a gradually decreasing amount of intercellular fluid, which was probably due to absorption of the distilled water in which the quartz particles were suspended.

1. *Acute inflammation.*—In the sections taken between 30 minutes and six days after the injection of quartz particles the reaction was typical of acute inflammation. This was true whether the quartz suspensions had been autoclaved or not. The quartz particles appear to have a toxic effect upon the polymorphonuclear and mononuclear leucocytes and small lymphocytes which enter the aggregations. All these cells are very rapidly broken up in this location. Similar cells retain their normal characteristics when they remain in the surrounding areolar tissue. In as short a time as six days the quartz particles become so intimately mixed with cell debris that the aggregations have an appearance of organization.

2. *Subacute inflammation.*—In the sections taken six days after the injection of quartz suspensions the histological picture is that of subacute inflammation. The areolar tissue on one side of the cartilage is extensively infiltrated by polymorphonuclear and mononuclear leucocytes and fewer lymphocytes. The mononuclear leucocytes (of the blood-stream) are seen in great numbers in the aggregations of silica particles, where they soon become disintegrated, leaving a framework of poorly-staining cells and cellular debris throughout the masses of particles. It is along this framework that the histiocytes later advance into the central portions of the aggregations. These mononuclear leucocytes do not engulf the quartz particles or débris. This function appears to be left for the mobilized tissue histiocytes.

3. *Chronic inflammation.*—Beginning as early as the sixth day and increasing as time goes on, the histopathological picture gradually changes to that of chronic inflammation. The tissue histiocytes and adventitial cells of the blood-vessels are mobilized, take on an amœboid appearance, and advance towards the aggregations of quartz particles and cellular debris. Many of these cells are seen in mitotic division. They become rounded as they advance into the masses of particles from the margins or along the framework formed by disintegrated mononuclear and polymorphonuclear leucocytes. Active phagocytosis of the cellular debris and engulfing of the quartz particles is carried on by the histiocytes until the entire mass, except for a few of the larger quartz particles, is taken up by the histiocytes. This process is complete in the smaller aggregations by the third, and, in the larger, by the sixth week. Large groups of these phagocytes, surrounded by thin layers of similar cells drawn out into long spindles, produce the appearance of early nodule formation in the foci which originally contained the quartz particles. While these changes are taking place in the aggregations there is an active granulation tissue formation in the surrounding areolar tissue. Numerous thin-walled blood-vessels are formed and carried into the nodules in long, thin strands of elongated, spindle-shaped cells.

If more than 30 mg. of quartz particles are injected in one site nodule formation does not always take place. The changes may progress until the masses of particles intimately mixed with mononuclear and polymorphonuclear leucocytes and their debris have the appearance of organization. Compact layers of histiocytes, which are gradually replaced by dense hyalinized connective tissue, are then laid down at the margins of the masses. These encapsulated masses of quartz particles and cell debris are similar to those described by Gardner. They react as a foreign body, and remain unchanged over long periods of time.

4. *Scar-tissue formation.*—From the sixth week onward the microscopic picture is that of scar-tissue formation. The phagocytic cells become elongated and spindle-shaped. This process begins at the periphery and extends towards the central portions of the nodules. Hyalinization begins at the outer margin and follows the above process to the centre of the nodule. As this change progresses there is a proportionate decrease in cellularity. The cells disappear by a gradual diminution in size, and simultaneously there develops, intercellularly, a firm

fibrous tissue which ultimately forms the silicotic nodules.

Either due to the presence of the silica or to an inadequate blood supply the cells in the central portions of some of the nodules break down and disappear, leaving irregularly rounded collections of a very finely granular substance. This has the appearance of caseous necrotic material, and by microincineration is shown to contain a large amount of siliceous material.

SUMMARY

The cellular response to the injection of finely particulate silica begins very early, and there is a definite sequence of events, which takes place between the first appearance of abnormal cells (30 minutes) and the formation of firm, hyalinized, fibrous nodules (6 months). The type of reaction depends to a certain extent upon the amount of silica injected at one site.

There is a marked difference between the circumscribed necrotic mass resulting from the injection of a large amount of silica (which reacts as a foreign body) and the caseous, necrotic centres of the fibrotic nodules resulting from the disintegration of the dust-laden cells.

The phagocytosis of the quartz is not accomplished by the mononuclear leucocytes of the blood stream which first appear and are broken down in the aggregations, but by histiocytes which multiply in the surrounding tissue and migrate into the aggregations of silica particles.

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TISSUE REACTION TO SERICITE

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DURING the past two years considerable interest has been shown in the possible rôle played by sericite in the production of the fibrotic nodules characteristic of silicosis. Jones,[1] of England, has shown by petrological examination and chemical analysis that the mineral residues of the silicotic lungs of miners and the minerals from the mines producing injurious dusts contain considerable amounts of sericite. He implies that sericite is essential in the production of silicosis. It has also been contended that in certain mines (the Kolar Gold Fields, India), where the percentage of sericite in the ground rock is said to be exceedingly low, practically none of the miners develop silicosis, whereas in mines where the percentage of sericite in the ground rock is high silicosis frequently occurs. Much that has been written on this subject is of a speculative nature. Recent papers have discussed the plausibility of the sericite hypothesis, but few have advanced experimental evidence to prove or disprove it.

Because of the current interest in this subject we decided to investigate the reaction produced in various tissues by the injection of sericite in the purest form obtainable. The tissue reaction to this sericite has been compared with that produced by the element silicon, the oxide silica, a closely related silicate mica, and barium sulphate. Three samples of sericite obtained through the courtesy of Dr. Poitevin, of the Department of Mines, Ottawa, and another sample of sericite from the gold mines of northern Ontario were used. To facilitate comparison of the lesions produced all the experimental procedures were carried out in an identical manner, so that the conditions would be constant, except for the nature of the material injected. The tissues studied were lungs, subcutaneous tissue of the ears, peribronchial and pre-auricular lymphatic nodes of rabbits.

MATERIALS INJECTED

(1) *Sericite.*—Three samples of sericite received from Dr. Poitevin, of the Department of Mines, Ottawa, were from the following locali-

ties: (*a*) Wait-a-bit Creek, B.C.—This sericite is very pure. It was picked grain by grain and analyzed by Robert A. A. Johnston, of the Department of Mines, Ottawa. The results of this analysis are compared with those of Shannon[2] for sericite (quoted by Jones[1] in his paper) which they practically duplicate.

	Johnston	*Shannon*[2]
SiO_2	46.05	46.58
Al_2O_3	38.36	37.46
Fe_2O_3	0.97	0.80
CaO	2.04	Trace
MgO	0.47	1.16
K_2O	6.19	6.38
Na_2O	2.98	0.64
Li_2O	0.34	
Cs_2O	0.03	6.06 above 110° C.
H_2O	2.48	0.30 below 110° C.

(*b*) Saint John County, N.B.—This sericite is also about 99 per cent pure. No analysis is given. (*c*) Landing Cove, near Louisburg, N.S. —This sample may contain 5 to 6 per cent of free silica. (*d*) A sample of sericite containing an unknown amount of free silica, from one of the gold mines of northern Ontario.

(2) *Silicon.* (3) *Silica* (powdered quartz). (4) *Mica* (powdered white mica). (5) *Barium sulphate.*

Preparation of Materials

The materials prepared for injection into the ears were silicon, quartz, sericite from four different localities in Canada, mica, and barium sulphate. Each sample was crushed in a diamond mortar until the majority of the particles measured less than 5 μ in the greatest diameter. Two suspensions of each dust were made up in distilled water. Weighed amounts of dust were added so that one suspension contained 20, the other 50 mg. of dust per c.c. of water. The suspensions were then autoclaved for thirty minutes.

The materials used for intratracheal administration were the four samples of sericite and a sample of mica. They were prepared as described above, to give 50 mg. of dust per c.c. of distilled water. These suspensions were autoclaved for thirty minutes.

The Methods of Injecting Material

One c.c. of the "20 mg." suspension was injected subcutaneously into the right ear, and a similar amount of the "50 mg." suspension into the left ear of three rabbits, with a 10 c.c. syringe having a large bore needle.

The suspensions for intratracheal administration were introduced in 3 c.c. amounts through a number 18F hard fibre catheter which had been inserted to the bifurcation of the trachea and then withdrawn a distance of one cm. The suspension was delivered into the catheter by means of a syringe. The material remaining in the catheter was forced into the bronchi with 2 or 3 c.c. of air. Three rabbits were used for each sample of dust.

Obtaining Material for Study

At time-intervals of 4, 5 and 6 months one of each group of rabbits of the subcutaneously injected series was killed. The portions of the ears containing the injected materials and the pre-auricular lymphatic nodes were taken for study.

Four, five and six months after the intratracheal injections of the dusts one rabbit of each group was killed, and the lungs and mediastinal lymphatic nodes were taken for section.

The tissues were fixed in formalin, dehydrated in alcohol, embedded and cut in paraffin. The siliceous material was demonstrated in adjoining sections by the technique of microincineration[3] and subsequent treatment of the ash with concentrated hydrochloric acid.

Microscopic Examination of Tissues

EARS

1. Sericite. — (*a*) *British Columbia sericite* — 6 months.

Sections of rabbit ear show large numbers of endothelial giant-cells containing sericite on one side of the ear cartilage. The giant-cells are of the foreign body type, each having a large number of granular vesicular nuclei, with one prominent nucleolus, arranged around the periphery of the cell. The nuclei are deeply stained and prominent. There is no evidence of degeneration of these cells. The sericite is in the form of fine fibres and scales. It is pale green in colour, and is seen in the central portions of the giant-cells. The particles have retained their sharply defined outlines and are still doubly refractive. Large groups of giant-cells are surrounded by strands of acellular, hyalinized connective tissue. There is no evidence of fibrosis.

The reactions produced in the ears by the injection of sericite from New Brunswick (Fig. 3), Nova Scotia, and Ontario are so similar to those produced by British Columbia sericite that a detailed description would merely be a repetition of the microscopic picture described above.

2. Silicon dioxide—6 months.

Sections of rabbit ears show a number of rounded fibrotic nodules in the subcutaneous tissue on one side of the ear cartilage. The nodules are composed of elongated, spindle-shaped fibroblasts, arranged concentrically to form large whorls. Some of the whorls are confluent, others are separated by wide strands of

hyalinized acellular connective tissue. This dense connective tissue also surrounds the whole group of nodules. Only the larger particles of quartz are visible and doubly refractive. The intracellular siliceous material is not doubly refractive.

3. SILICON—6 months.

Sections of rabbit ears show many large and small aggregations of fine particles of silicon in the tissue spaces of the subcutaneous tissue on one side of the ear cartilage. The silicon is black. It is not doubly refractive. It is seen as irregularly rounded and elongated aggregations of fine particles lying free in the tissue spaces of fairly dense hyalinized connective tissue of the ear. The fine black particles are also seen in the cytoplasm of an occasional tissue histiocyte. There is no evidence of any cellular reaction to this material. (Fig. 6).

4. BARIUM SULPHATE—6 months.

Sections of rabbit ear show numerous large endothelial giant-cells, each containing a large amount of barium sulphate distributed diffusely throughout the subcutaneous tissue on one side of the ear cartilage. The giant-cells are of the foreign-body type, with many granular vesicular nuclei (each with one prominent nucleolus) congregated in crescent formation at one end of the cell. These cells all contain a large amount of barium sulphate which has a uniform finely granular appearance and is greyish brown in colour. This material is not doubly refractive. Single giant-cells or small groups of these cells are surrounded by thin strands of hyalinized acellular connective tissue. The barium sulphate is also seen in an occasional distended histiocyte at a distance from the main mass. (Fig. 4).

LUNGS

1. SERICITE. — (*a*) *British Columbia sericite* — 6 months.

Sections of rabbit lung show numbers of alveolar spaces, in small and large irregular foci in the parenchyma of the lung, filled with endothelial giant-cells containing sericite. The giant-cells are of the foreign body type, having numerous granular vesicular nuclei, with one prominent nucleolus congregated towards one end of the cell, usually in crescentic formation. The clear cytoplasm of the cells contains varying amounts of sericite in the form of fine fibres and scales. The nuclei are prominent and stain deeply. The cells do not appear

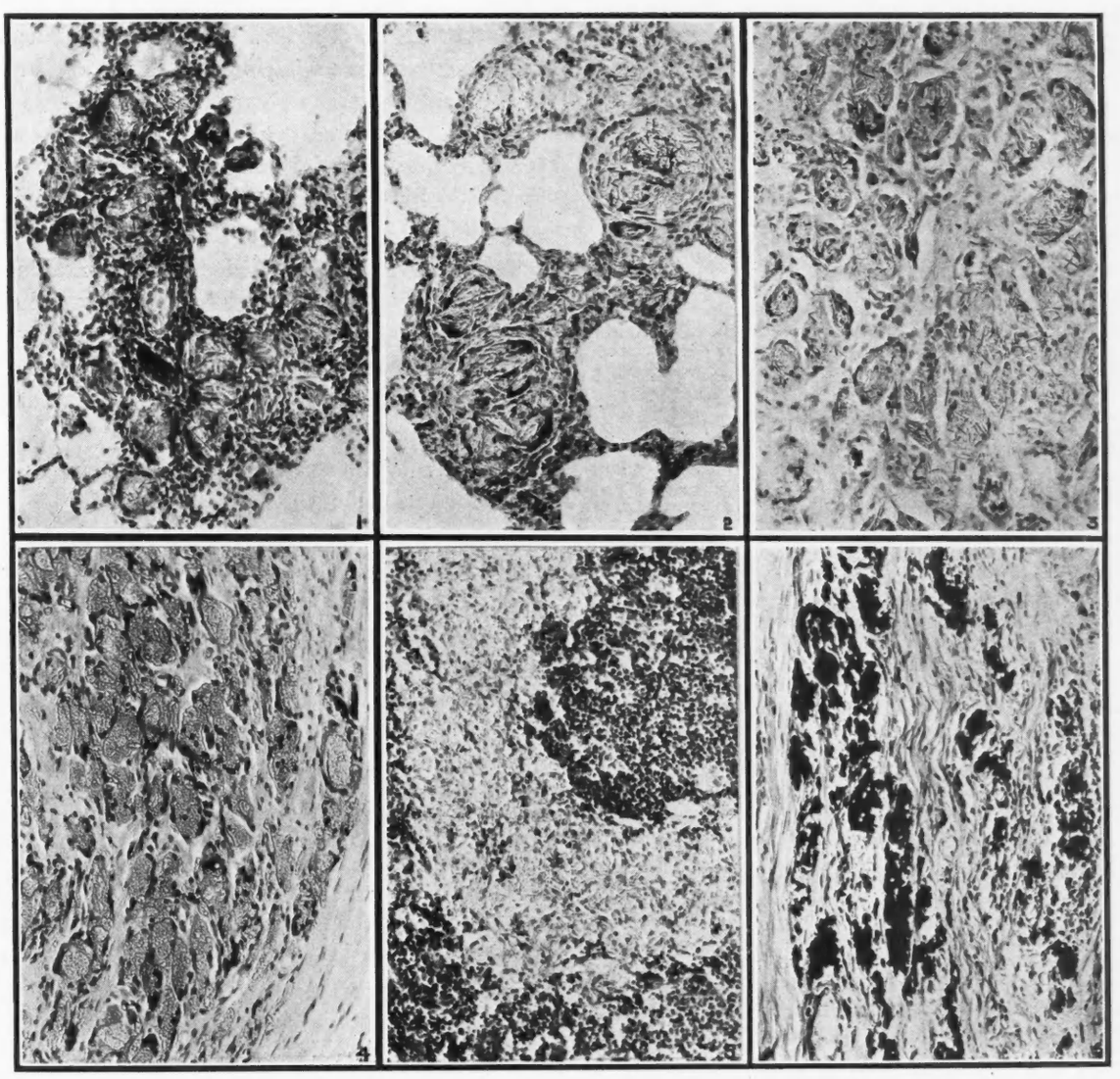

FIG. 1.—Lung, sericite, New Brunswick—6 months . FIG. 2.—Lung, sericite, British Columbia—6 months. FIG. 3.—Subcutaneous tissue, sericite, New Brunswick —6 months. FIG. 4.—Subcutaneous tissue, barium sulphate—6 months. FIG. 5.—Lymph node, sericite, New Brunswick—6 months. FIG. 6.—Subcutaneous tissue, silicon—6 months.

to be damaged in any way by the presence of the sericite. The fibres and scales of sericite retain their sharply defined outlines and their bi-refringence. Some of the giant-cells are small and lie free in the alveolar spaces; others are so large that they fill the spaces, frequently distending them. When the giant-cells fill the spaces they are usually surrounded by two or four layers of alveolar endothelium. The surrounding alveolar spaces and the remainder of the lung tissue are not remarkable. There is no evidence of fibrosis or fibrotic nodule formation. (Fig. 2).

The cellular reaction to New Brunswick (Fig. 1) and Nova Scotia sericite in the lung tissue, as in the ears, is so similar to that produced by British Columbia sericite that no distinction can be made microscopically.

2. MICA

Sections of rabbit lung show a number of groups of adjacent alveolar spaces filled with fine scales of mica. The alveolar walls are still intact and appear as septa traversing the aggregations of mica particles. A few foreign body giant-cells containing mica particles are seen in alveolar spaces. These cells do not appear to be damaged in any way by the presence of the mica. In most of the affected alveoli the particles are lying free in the spaces. There is no evidence of fibrosis. The remainder of the lung tissue is not remarkable. The mica particles are doubly refractive.

3. SILICA—6 months.

Sections of rabbit lung show numerous fibrotic nodules. The nodules are irregularly rounded in outline and vary considerably in size. Some of them are confluent; others are discrete. The nodules are composed of fibroblasts arranged concentrically to form whorls. The central portions of many of them have a caseous necrotic appearance. Each nodule has a number of thin-walled blood-vessels. The surrounding alveolar spaces contain many dust-filled monocytes. There is extensive thickening of the alveolar walls in the affected foci. Only the large particles of silica are doubly refractive.

LYMPHATIC NODES

1. SERICITE.—*British Columbia*—6 months.

Sections of pre-auricular lymphatic nodes show a number of lymph sinuses filled with endothelial giant-cells containing sericite. The giant-cells are of the foreign-body type, having a number of granular vesicular nuclei, each with one prominent nucleolus, arranged around the periphery of the cells. The giant-cells contain in their central portions fine fibres and scales of sericite, which is pale green in colour. A number of the lymphatic sinuses are filled with these giant-cells. There is no destruction of the architecture of the lymphoid or reticulo-endothelial elements of the gland. There is no evidence of fibrosis in or around the aggregations of giant-cells. The smallest particles retain their bi-refringence.

The cellular reaction to New Brunswick (Fig. 5), Nova Scotia, and Ontario sericites in the lymphatic nodes is similar to that produced by British Columbia sericite.

2. SILICA.—6 months.

Sections of pre-auricular lymphatic nodes show fairly extensive destruction of the architecture of the node by the formation of fibrotic nodules. The fibrotic nodules have caseous necrotic, finely granular, acellular central portions, surrounded by fibroblasts arranged concentrically to form whorls. The whorls are surrounded by thick layers of hyalinized connective tissue. The fibrous nodules appear to form in the lymphatic sinuses and extend, replacing the reticulo-endothelial elements and destroying the lymphoid elements of the lymphatic node. Numerous fibrotic nodules are seen at the sites of the peripheral lymphatic sinuses which are almost completely fibrosed. Only the larger particles of quartz are doubly refractive.

COMMENT

The tissue reaction to the injection of sericite is essentially the same in the different tissues studied. The reactions produced by samples of sericite from four widely separated districts are so similar that they cannot be distinguished microscopically. The reaction closely resembles that produced by an innocuous foreign body. The particles of sericite are taken up by foreign body giant-cells, which either remain at the site of injection or transport the material to the sinuses of the regional lymphatic nodes. Only the finer particles of sericite are seen in the lymphatic nodes. There is no difference in the severity or extent of the reaction in the tissue sections taken at 4, 5 and 6 months after injection. The fine particles of sericite remain doubly refractive in the giant-cells and show no morphological changes. There is no evidence of fibrosis in any of the tissues examined. In these respects the reactions produced in the tissues by the injection of sericite are very similar to that produced by the injection of mica and barium sulphate.

The tissue reaction to silicon is remarkable on account of the noticeable absence of any cellular proliferation. The material appears to lie innocently in the tissue spaces. The tissue response to silicon closely resembles the reaction to the presence of carbon particles.

The tissue reaction to finely particulate quartz, as seen in the control animals of this experiment, differs markedly from that described above. It has been described in detail in another paper of this series, "The Cellular Reaction to Silica".[4] In these tissues definite nodular fibrosis is seen in the lungs, subcutaneous tissues and lymphatic nodes in the sections taken at 4, 5 and 6 months. They show a definite progression in the pathological changes taking place, until typical fibrotic nodules are formed. In the later stages many of the fibrotic nodules produced by the injection of finely particulate quartz have caseous necrotic central portions. On the other hand we have not observed any necrotic areas in the lesions produced by sericite, no matter how extensive the giant-cell reaction to the injection or how closely packed these cells might be. In the lung, following quartz injection, large groups of alveoli are destroyed and replaced by fibrotic nodules. When sericite is injected in the same manner

groups of alveoli become filled with giant-cells containing the dust, but there is no destruction of lung tissue.

It is interesting to note that the Nova Scotia and Ontario sericites containing some free silica produce no fibrous tissue reaction. Even the small particles of sericite retain their original size and sharp, clearly cut outline throughout the period of observation and are still doubly refractive. The smaller silica particles soon lose their bi-refringence.

When the materials are injected subcutaneously our findings in the subcutaneous tissues and regional lymphatic nodes are in agreement with those of Kettle.[5] The results of intratracheal injection are also very similar to those of Lemon and Higgins,[6, 7] who were unable to produce fibrotic nodules by introducing aluminium oxide and borosilicate-glass intratracheally, but produced definite nodules by the introduction of silica in this manner.

SUMMARY

Sericite was introduced in watery suspension into the lungs of rabbits. Similar suspensions were injected subcutaneously into the ears. The cellular reaction in the tissues and regional lymphatic nodes was followed at intervals and compared with that of finely particulate silicon, silica, mica and barium sulphate. The reaction to sericite is comparable to that produced by the innocuous substances, but not to that to free silica. Various samples of sericite from Nova Scotia, New Brunswick, British Columbia and Ontario were used in these experiments.

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THE TREATMENT OF CANCER OF THE LARYNX AND HYPOPHARYNX*

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IT is stated that in Canada each year 10,646 persons die from cancer. In recent years renewed interest has been shown in the treatment of cancer, and particularly of cancer of the larynx and hypopharynx. Since the pioneer work of Semon[1] and Butlin[2] much has been added to our knowledge. The surgical mortality has been markedly decreased by improvement in technique. The reported success of StClair Thomson,[3] Colledge[4] and Trotter[5] in England, of Gluck in Germany, Tapia in Spain, and MacKenty, Jackson and others in the United States has stimulated all laryngologists to greater effort. The percentage of cures today of cancer of the larynx is probably greater than in that of any other part of the body. To quote Crile—"There is no surgical operation that offers so certain and so permanent a cure for cancer as total laryngectomy in intrinsic cancer of the larynx."

Early diagnosis has been stressed as the *sine qua non* in the successful treatment of cancer. This is particularly so in regard to the larynx and hypopharynx. It is a tragic fact that, in spite of the extensive educational propaganda of the press, both medical and lay, and in spite of the many addresses on the subject, relatively few cases are referred to the laryngologist in the early stage.

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SALIENT FEATURES

It is not our intention to attempt a comprehensive review of the history, frequency, classification and pathological manifestations. We shall confine our remarks to a brief summary of the salient features of the disease, the differential diagnosis, and the methods of treatment that appear to offer the best hope of permanent arrest.

The upper respiratory tract is lined for the most part with pavement epithelium. In part of the larynx we find columnar epithelium, and in the pharynx, lymphoid tissue. The majority of growths are squamous-cell epithelioma, although lymphepithelial carcinoma and lymphosarcoma are not infrequent. MacKenty's reports show 96 per cent squamous cell carcinoma, 2 per cent basal cell, 1 per cent papillary, and 1 per cent adenocarcinoma. In Tucker's series of 200 cases there were 95.5 per cent squamous, 4 per cent basal-cell carcinoma, with 0.5 per cent sarcoma. The latter is usually in the subglottic region. When consulting the literature on cancer one has considerable difficulty at times in fully understanding the text, owing to the confusion that exists in the classification of the different pathological types. The term "epidermoid" was given by Lacassagne to designate a fully differentiated epithelioma arising from pavement epithelioma, and many of the growths of the larynx would appear to be of this type.

Some pathologists and clinicians lay great stress on the advisability of estimating the malignancy of a tumour according to Broder's classification. Others do not accept grading unreservedly, pointing out that the same type of growth may present different grades of malignancy in different sites. However, as far as the larynx and hypopharynx is concerned, the value of Broder's method of classification, independently of the clinical history, is well illustrated by the experience of StClair Thomson. In his report of 60 cases in which laryngo-fissure had been performed he states — "Seventy-two per cent of grade four, 26 per cent of grades three and two, but only 6.6 per cent of grade one recurred."

We recognize, clinically, that growths arising from the vocal cords tend to remain localized for relatively long periods. In other parts of the larynx rapid extension with subsequent lymphatic involvement is the rule. The possibility of arrest depends in a large measure on the curative method employed in each specific case.

CLINICAL CLASSIFICATION

The clinical classification suggested by Krishaber in 1879 has been generally adopted. Growths originating within and confined to the interior of the larynx, *i.e.*, vocal cords, ventricular bands, the ventricles, posterior commissure, and subglottic space were classified as *intrinsic* growths of the larynx. Those of the arytenoid region, aryepiglottic folds, epiglottis, pyriform sinus, the lateral and posterior walls of the pharynx, and the post-cricoid pharyngeal surface were grouped as *extrinsic* growths of the larynx. The large group of advanced cases, whose origin was in doubt, a combination of intrinsic and extrinsic were placed in the category—*mixed*. Experience has shown that the so-called intrinsic tumours are slow in metastasizing and rarely the source of secondary growths, while the others are clinically highly malignant. It is probable that the majority of the mixed group are primarily intrinsic. Some laryngologists prefer to simplify this classification into two main groups: (*a*) laryngeal—all growths originating within the larynx, whether confined to it or not; (*b*) hypopharyngeal—those arising from the hypopharynx itself. From the standpoint of treatment, this simplification has its advantages and we have adopted it.

SIGNS AND SYMPTOMS

It is now well known that the favourite site of origin of laryngeal cancer is in the anterior half of one vocal cord, and that it never appears simultaneously in two places in the larynx. The growth may remain localized for weeks, months or for several years. During this period the only symptom may be slight hoarseness; cough is seldom noted in early cases. A laryngeal growth originating elsewhere in the larynx may produce dyspnœa by obstruction.

Growths of the hypopharynx in the early stage produce no symptoms beyond a feeling of local discomfort, later causing slight dysphagia, at times with occasional pains referred to the head. Not infrequently the first definite sign is the presence of a tender, hard, enlarged cervical lymph node. To my mind we cannot too strongly emphasize the fact that severe pain, marked dyspnœa or dysphagia, hæmorrhage and fetid

discharge are present only after widespread infiltration and ulceration have taken place.

DIFFERENTIAL DIAGNOSIS

The diseases most closely resembling cancer of the throat are benign tumours, tuberculosis and syphilis. Of the first, the commonest are papilloma, fibroma and angioma, large vocal nodes, pachydermia or areas of keratosis. Primary tuberculosis has been reported, but in our experience a tuberculous focus in some other part of the body, usually the lung, has been found after careful investigation. A tuberculoma of a vocal cord is usually surrounded by the characteristic pseudo-œdema of tuberculous infiltration with superficial ulceration of the mucosa. While it is stated that a positive diagnosis cannot always be made by a Wassermann test this is always indicated. One must not forget that cancer in the throat may be associated with a tuberculous or syphilitic lesion. In his 200 cases Tucker found 1 associated with laryngeal tuberculosis, 8 with tuberculosis of the lung and 7 with syphilis.

Indirect laryngoscopy by means of the laryngeal mirror may give us a good view, but suspension or direct laryngoscopy is always indicated, and bronchoscopy and œsophagoscopy are desirable in many cases. Only by such means are we able to determine the size of the growth and the depth of infiltration of adjacent tissues. In the advanced case the diagnosis is not difficult. The history, site of lesion, its colour and resistance to touch, as well as the age of the patient, are the important factors in the early case. MacKenty[9] and Chevalier Jackson[10] in particular have called attention to the fact that not infrequently a growth apparently benign may remain in the so-called pre-cancerous state for several years, to become suddenly highly malignant. Such suspicious growths should be examined at regular intervals. If after a period of vocal rest they have increased in size they should be looked upon as cancerous until proved otherwise.

It is our practice to have a biopsy performed in all growths of the larynx and hypopharynx. While the pathological report may not be conclusive, it is of inestimable value in determining the correct procedure to be followed. The view so long held that biopsy is bad practice and stimulates a growth to renewed activity is not borne out by clinical experience. The advantages to be gained by early and accurate diagnosis in the throat far outweigh any theoretical dangers.

TREATMENT

The accepted methods of treatment of cancer of the larynx and hypopharynx are: (1) Excision of the growth with a surrounding area of healthy tissue, followed by irradiation in selected cases; (2) irradiation with roentgen rays or radium (deep therapy).

Approximately 80 per cent of laryngeal growths can be successfully removed by the operation variously known as laryngo-fissure, thyrotomy, or thyro-chondrotomy. This consists in splitting the larynx externally and removing the growth *en bloc*, together with the underlying cartilage of the thyroid ala. The surgical mortality is less than 1 per cent. Lasting cures have been obtained in from 75 to 90 per cent of cases thus treated. There is no post-operative deformity. A useful voice is preserved, depending on the amount of tissue removed.

The following case illustrates the type for which this method is particularly suited.

CASE 1

F.E.G., male, aged 41, with hoarseness, intermittent for several years, persistent for two years. His general health was good. General physical examination was negative. The Wassermann test was negative. The sputum was negative for tubercle bacillus. Examination of the larynx revealed a hard greyish growth, the size of a large pea, attached by a broad base to the anterior half of the left vocal cord. Biopsy showed it to be a carcinoma of the epidermoid type, of low malignancy. Thyro-chondrotomy was performed on January 26, 1935. The patient is progressing favourably.

To obtain a lasting cure it is important that not only the growth itself but a margin of surrounding healthy tissue of from one-eighth to one-quarter of an inch in width be removed *en bloc*. Opinions differ as to the necessity of removing the underlying cartilage when no gross involvement is evident.

Highly malignant growths, even though apparently circumscribed, do not lend themselves to successful removal by simple laryngo-fissure. Growths of this type, those that have extended to involve both sides of the larynx, and some which have invaded the aryepiglottic fold, arytenoids, or epiglottis can be successfully removed by total laryngectomy. This operation entails complete excision of the epiglottis and larynx, with the thyroid and cricoid cartilages. The severed trachea is anchored to the skin at

the level of the suprasternal notch. If the growth extends beyond the larynx a partial pharyngectomy in addition to laryngectomy may be necessary. The surgical mortality has been reduced through improvement in technique to less than 5 per cent. Soerensen[7] reports 788 cases thus treated, Tapia[8] 107, MacKenty[9] 102, Lewis 83, New[15] 60, Colledge[4] 42, Crile[11] 27. Taking into consideration cases

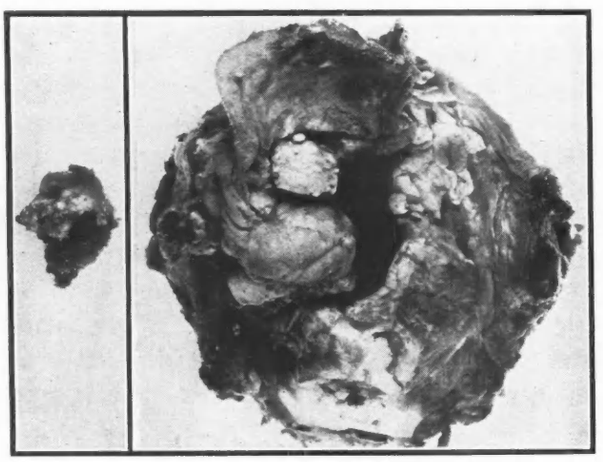

FIG. 1 FIG. 2

FIG. 1. (*Case 1*).—Epidermoid carcinoma (actual size) of left vocal cord removed *en bloc* by laryngofissure. Patient has now a strong resonant voice.

FIG. 2. (*Case 3*).—Larynx and epiglottis viewed from above and behind (actual size). The cancerous growth involving the whole of the left side and the anterior third of the right side and epiglottis is well seen.

of both so-called intrinsic and extrinsic cancer of the larynx, the percentage of five-year cures is approximately twenty. Eliminating the extrinsic group, the percentage is approximately sixty-five.

The following cases are illustrative.

CASE 2

M.R., a male, aged 42, had an extensive fungating growth involving and almost completely filling the larynx. Biopsy showed it to be a basal-cell carcinoma. There was no glandular involvement. Total laryngectomy was performed in 1922. There has been no recurrence to date (12 years). The patient has married, has three children, and has led an active business career since operation. He has enjoyed excellent health. By diligent and persistent effort, he has trained his pharyngeal muscles to coordinate to such a degree that he has acquired a strong useful speech, heard distinctly without artificial aid at a distance of one hundred feet.

CASE 3

W.B., a male, aged 52, had hoarseness for five months, soreness on the left side of the neck three months, cough with blood-streaked sputum one month. The loss of weight in the past month was five pounds. He had been using laryngeal sprays for the past two months without relief. Examination on November 17, 1934, showed a large, irregular, hard, infiltrating ulcerating growth. This appeared to have originated in the region of the left vocal angle, but now involved the arytenoids, interarytenoid space, subglottic area, and the left aryepiglottic fold. There were two large hard tender lymph nodes on the left side. Biopsy showed it to be an epidermoid carcinoma with metastases to glands. Total laryngectomy and partial pharyngectomy with excision of the affected glands was performed on December 19, 1934. The operation was done in one stage (MacKenty technique) under intratracheal cyclopropane gas anæsthesia. No post-operative shock was evident. Convalescence was uninterrupted. Two weeks following operation, protracted, fractional dosage of roentgen ray was begun (Coutard method). A daily dose of 300 r was given alternately on each side of the neck, filtered through a composite filter of 0.5 mm. of tin, aluminum and copper. The patient received a total dosage through each port of 2100 r. Typical epithelitis and epidermitis appeared, but completely disappeared within ten days. The throat, now completely healed, shows no evidence of malignancy and the patient is well.

This case well illustrates the type of extensive, highly malignant cancer formerly classified as extrinsic and considered inoperable and hopeless. The combination of total laryngectomy with post-operative deep roentgen ray therapy offers the best hope of permanent arrest.

CANCER OF THE HYPOPHARYNX

Growths originating in the epiglottis are usually of low malignancy, and when confined to it can be successfully removed by surgical diathermy. When extension has taken place to the aryepiglottic fold or the base of the tongue permanent arrest is doubtful. For growths originating in other parts of the hypopharynx lateral transthyroid, anterior translingual and subhyoid pharyngotomy has been employed with success, in combination with radium implantation.

IRRADIATION AS A CURATIVE METHOD

Irradiation alone as a curative and palliative agent has been extensively used in the throat. The ultimate results have hitherto been so disappointing that few clinicians are prepared to recommend it except as a palliative measure for inoperable cases. Within the past few years, very encouraging reports have been made by radiologists using roentgen rays and teleradium according to the method advocated by Coutard[12] of the Fondation Curie of Paris. This is known as the protracted, fractional dosage method. According to Coutard, relatively small doses are given daily, controlling the dose by the patient's reaction until an extraordinary high dosage has been received, sufficient to destroy the normal epithelium of the larynx and pharynx. This is evident by the appearance of a greyish white fibrinous exudate in the throat—so-called epithe-

litis, with similar skin reaction epidermitis. The treatment is based on the theory that a dose sufficient to destroy normal epithelium will destroy a cancerous growth arising from similar epithelium. As cancer cells appear to be most radiosensitive during the transitional or mitotic stage the daily dose attacks the cells as they develop. Coutard reports 77 cases of laryngeal cancer treated in this way, with 27 per cent surviving after seven years. He however does not state whether they were all intrinsic or whether some were extrinsic cases, so we presume they were the former. These results are encouraging, but Coutard utters a final word of caution. He says, "The cure of cancer is still difficult and still dangerous. A very small margin exists sometimes between the dose that will determine a cure and the dose that will provoke an injury".

Other radiological centres have adopted his method, and several enthusiastic reports have been published, some claiming that it is the method of choice in the treatment of all cases of cancer of the throat. Others suggest that radiation should be tried first and growths proving radioresistant can then be treated surgically.

Every clinician is familiar with cases in which the cancerous growth, treated by irradiation, appeared to melt away like butter in the midday sun, only to recur in a few months or years in neighbouring structures. Every surgeon can testify regarding the disastrous results of surgical interference in tissues whose vitality has been lowered by irradiation. Until sufficient time has elapsed to prove or disprove these recent claims one must withhold judgment.

Stanford Cade,[13] of Westminster Hospital, London, in reporting his results, gives the British viewpoint. He says, "Radiation is not to be regarded as a method in opposition to the older established surgical procedures. It may be the essence of modern treatment, but not to the exclusion of certain operative procedures." Gabriel Tucker[14] reflects the views of the American laryngologists. He says: "The use of radium and x-ray is now conceded to have no place in the treatment of cancer of the larynx except in some cases as post-operative radiation after laryngo-fissure or laryngectomy, to prevent glandular invasion".

Every new method of treatment of cancer is hailed by a few enthusiasts as a sure cure. Our ignorance of cancer has been described by one eminent physician as abyssmal. One day the cause will probably be found by research workers in the field of biochemistry. Until then the physician, while keeping an open mind regarding the claims of enthusiasts, and welcoming the advances made in irradiation therapy, will do well to ponder the lessons of medical history. At least five years must elapse before judgment can be pronounced on the recent claims of radiologists. Until that time, as far as cancer of the larynx and hypopharynx is concerned, the physician will be giving his patient the best that medical science offers, at present, by advocating complete surgical removal, when possible, followed by irradiation in selected cases by the protracted fractional method of Coutard.

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HÆMANGIOMA WITH FRACTURE THROUGH THE INVADED BONE

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THE strange appearance of an extensive hæmangioma of the arm has caused sufficient interest to suggest the advisability of publishing a brief report of the case. In addition to the frank curiosity provoked by so unusual an affliction, the case is of clinical value because it affords an excellent demonstration of the fact that a fracture through a bone extensively invaded by hæmangioma may unite without delay and without complications.

CASE REPORT

The patient, a man of 43, had suffered from a hæmangioma involving the whole of his right arm since infancy. It undoubtedly dated from birth. The right hand and arm had always been so unsightly that he kept them covered because of the expressions of horror which they evoked. The right elbow had for many years been stiff, due to complete destruction of the joint by the invading tumour, and the arm had been weak because of the destruction of the muscle. In spite of this handicap the patient had earned his living before the public ever since he was six years of age, and at present occupies a responsible executive position with a large firm. His hand was, however, kept constantly covered with a glove.

On inspection, the hand and arm, including the pectoral region, were seen to be enormously distended and puffy, with bluish marks immediately beneath the skin, so close, in fact, that they seemed about to burst at any moment. The hand and particularly the fingers were soft and puffy. (See Fig. 1). The skin was soft, smooth and moist, and this distended puffy hand covered with moist skin suggested nothing so much as a wet operating-room glove filled with warm water. As one grasped and squeezed the hand, it seemed to become compressed softly to about half its size. (See Fig. 2). The bones were felt easily through the thick fluid layer of venous blood and seemed to be frail, delicate sticks in the midst of a boggy sac. As soon as the pressure was removed, the hand slowly swelled and resumed the puffy shape which is seen in the photograph. That this huge cavernous mass communicated with the general circulation was proved by the fact that on elevating the arm above the head it slowly drained empty and collapsed, only to refill when the arm was lowered. Although present during the growing years, this hæmangioma had resulted in no increase in the length of the arm.

In the literature on hæmangiomata of the extremities the typical x-ray appearance is rarely stressed. In this case we have a classical demonstration of all the points which characterize the x-ray appearance of such a tumour. (See Fig. 3). The muscle lines are obliterated and cannot be followed, due to the fact that the muscle bodies are in large measure replaced by invading tumour. The bones are seen to be thin, frail, and very irregular, with a shaggy or ragged cortex. In the muscle and throughout the tumour are seen many round opaque plaques or buttons, due to deposit of calcium salt in small loops or sacs of the tumour which have become thrombosed. All of these details are characteristic of the x-ray appearance of hæmangioma in muscle and bone.

The patient was playing "shinny" one morning on a small pond of ice with his children, and while attempting to shoot the puck very easily along the ice suddenly heard and felt a snap in the region of the right forearm. He was prostrated by severe pain and recognized immediately that he had broken his arm, which fact was confirmed by examination.

In undertaking to reduce this fracture of ragged diseased bone in a thick bed of thin-walled blood spaces, one was immediately concerned with the possibility of tearing the vessels of the hæmangioma and causing an extensive hæmatoma into the whole substance of the forearm. Difficulty was also anticipated in manipulating the bones through the thick pad of tumour which lay about them. However, the reduction of the fracture proved singularly easy. The ragged ends of bone did not seem to tear any further blood vessel, or if they did the hæmorrhage was not great, probably because the pressure in hæmangiomata is almost zero. The strange soft compressibility of the whole tumour simplified the reduction of the fracture, inasmuch as it was possible to feel the ends of the bone much more easily than can be done in a normal arm. There was almost no overlying muscle tissue, and the blood could readily be squeezed out of the hæmangioma so that one had the feeling of picking up the actual bone covered only by skin. In this manner the ends were readily manipulated into position and a plaster splint was applied.

A guarded prognosis was given because it was recognized that this was a pathological fracture through diseased bone which was robbed of most of the calcium and phosphorus content which constitutes normal bone strength. The patient was told that the problem of delayed union or lack of union might have to be faced. His own expressed desire was that, unless union was prompt and uncomplicated, the arm should be amputated at the shoulder. Anxiety as to the outcome was soon allayed, as it became evident that the fracture was uniting without delay and that the position was remaining good in spite of the looseness of the mass of tissue surrounding the bone. In the usual length of time, namely six weeks, the splint was removed and it was obvious that a firm union had occurred. The patient was able to return to his work shortly thereafter, and has experienced no difficulty since.

The treatment of the hæmangioma itself caused a great deal of thought and discussion among various members of the staff. Three recognized methods of treating this condition are known.

1. *Surgical removal.*—It is obvious that effective surgical removal of the hæmangioma in this case would call for a fore-quarter amputation. Since this man's arm has been, and continues to be, useful to him in earning his livelihood, such a procedure was not to be considered.

2. *Radiation.*[5] — This second method seems equally futile, because of the extent and depth of the tumour. It would be impossible to produce an obliteration of the tumour, involving as it does all the tissues and structures of the arm.

3. *Injection of a sclerosing agent.*[1, 2, 3, 4, 6, 7]— A third treatment of hæmangioma which cannot be removed by surgical means nor obliterated by radiation has been suggested, namely, injection with a sclerosing agent. Good results are reported from this method, and there can be little doubt that, in this case, it would have been possible to obliterate most of the large venous cavities by fusing the walls with an agent such as sodium morrhuate. However, if this were accomplished, it would not increase the usefulness of the arm, because the muscles are atrophied, the elbow is stiff, and while a slight improvement in appearance might result, there would certainly be no increased strength or usefulness. The patient himself, realizing the futility of this treatment for practical results, prefers that nothing further be done. We are forced to conclude, therefore, that none of the three usual treatments can be recommended in this case.

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RECENT INVESTIGATIONS ON THE EFFECT OF SO-CALLED ANTI-INFLAMMATORY SUBSTANCES

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MANY investigations have been carried out concerning the anti-inflammatory effects of various chemical substances. Among the different methods employed in the studies of such effects the histological method plays an important rôle, as it represents an especially fine indicator of cellular changes.

So far as the microscopical analysis of inflammatory phenomena is concerned, in spite of ever-recurring criticism (Grawitz,[1] von Moellendorff[2]) in regard to the predomination of the hæmatogenous reaction, as proved by Waller-Cohnheim's experiment, it must be assumed that an inflammation cannot take place without the cooperation of the blood vessels. On the other hand, it is well known that even in tissues which themselves contain no blood vessels, such as endocardial valves, cornea, or cartilage, an inflammatory reaction can take place. Under these conditions proliferation as well as exudation takes place, but these develop in different places. Under these conditions the inflammatory cells migrate from the neighbouring vessels towards the area of inflammation. Without any vessels there may, then, be sometimes reactive processes, but inflammation in the strict sense does not take place in the affected area, but in the adjoining vascularized region.

In a series of studies the writer[3a] has investigated the behaviour of the "aleucocytic organism" towards septic infection. For this purpose adult rabbits weighing on an average 2,500 g. were injected subcutaneously with 2 to 3 c.c. pure benzol every day. The peripheral blood, taken from the marginal vein of the ear, was carefully examined daily, and the white cells were counted two to three times a day. After six to eight injections, as a rule, both the granulocytes and the agranulocytes had nearly completely disappeared, there being only 20 to 60 white cells per c.c. present, amongst which the monocytes showed an especially marked resistance. Microscopical examination of the bone marrow revealed a destruction of the myeloid

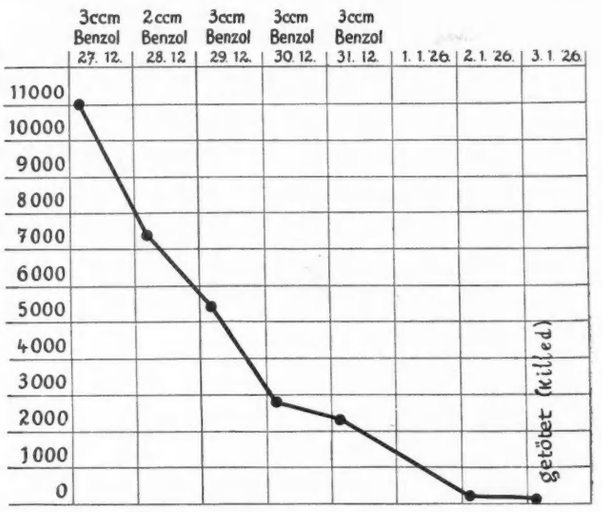

Chart showing the decrease of the white cells in the peripheral blood under the influence of benzol.

substance, while the lymphoid marrow and the lymphoid tissues were somewhat better preserved.

The question now arises as to the reaction of such an aleucocytic or leucopenic body under inflammatory conditions. In order to study the relationship between the hæmatogenous and histiogenous reaction animals chronically poisoned with benzol were injected intravenously by an emulsion of *Staphylococcus pyogenes aureus* (half a platinum loop of colonies in 1 c.c. of broth). Before inaugurating the infec-

tion the benzol injections were stopped. Obviously, we are able to regulate and to influence the peripheral blood as desired for the experimental conditions. After the infection the blood picture undergoes changes as to quality and quantity, according to the stage of aleucocytosis reached experimentally. The polymorphonuclear leucocytes have been destroyed by the effect of the benzol, and likewise the lymphocytes. A subsidiary and supplementary reaction of immature granulocytes is seen, as indicated by the appearance of metamyelocytes, myelocytes, and even promyelocytes in the blood-stream. Their number occasionally rises up to 6,000 per c.c. In other words, the body shows a definite, atypical reactive tendency toward the septic infection in so far as blood and hæmopoietic organs are concerned, though, on the whole, this reaction is an incomplete and pathological one. Regenerative processes in the bone marrow do not take place under the influence of the infection. The death of the animals occurs in 6 to 10 days after the injection of the staphylococci. The gross appearance reveals the formation of true abscesses and sometimes septic infarcts of yellowish colour and rubber-like consistence in the various organs, especially the heart muscle, kidney and liver. The microscopical examination of these lesions shows a very characteristic picture: only foci of pure necrosis are present, produced by the toxic effect of the cocci; there is no cellular reaction in the tissue itself nor in the neighbouring areas; neither exudation nor proliferation is found, the specific inflammatory cells, the polymorphonuclear granulocytes being absent. But, when a small number of white cells, *e.g.*, 1,000 cells per c.c. at the beginning of the septic infection, were noted, an exudation with cellular reaction at the marginal zone of the foci was observed, naturally less marked than normal. Under these conditions a vascular reaction could take place. Alteration of the tissues, even in the complete aleucocytic stages, of course, had occurred. On the other hand, the histiocytes were found in their usual number and performing their physiological normal function, but this histiogenous reaction never replaced the hæmatogenous vascular reaction. Likewise, the endothelial cells of the blood vessels do not play any rôle in the production of inflammatory cells.

With the cultures of tissues poisoned with benzol and infected with staphylococci *in vitro* corresponding results have been obtained. The myeloid tissue was damaged; a leucocytic reaction in the tissue cultures of spleen and bone marrow did not occur, while the histiocytes and monocytes were not injured by the poison. Their behaviour towards storage of vital dyes and their phagocytosis of the cocci were indicated by their normal morphological and functional abilities.

Under inflammatory conditions, in the absence of white blood cells we do not, therefore, have to deal with an actual inflammation in the strict sense, although we have demonstrated that a histiogenous reaction—on the part of the fixed fibrocytes and the resting wandering cells (histiocytes)—may be preserved.

During the first stages of inflammation, that is, within the first two days, it is possible to distinguish the cells of hæmatogenous from those of histiogenous origin.[3b] Sometimes the first and sometimes the second type of cells predominates, but the predominance of either kind over the other does not permit us to draw any conclusion as to the intensity of the inflammation. The same fact holds good where either granulocytes or agranulocytes predominate over each other. We know, for instance, that specific acute lymphocytic inflammatory reactions, such as that seen in interstitial nephritis and in some forms of meningitis, or histiogenous monocytic reactions (malaria, bacillus monocytogenus), as well as the typical acute purulent leucocytic reactions due to the action of pyogenic cocci, occur. On the other hand, a predominance of histiocytes or polyblasts over fibrocytes does not give any evidence as to the intensity of the inflammation; it is only indicative of temporary stages of duration.

These facts must be emphasized in estimating the recent work of Wallbach,[4] who in a series of papers, on account of various and sometimes very slight changes in the microscopical picture, draws certain conclusions regarding the anti-inflammatory influence of some chemical substances. Before producing an inflammatory irritation he treated white mice with different preparations for several days. His inflammatory test experiment consisted in a subcutaneous injection of 0.02 c.c. of benzol. During the following four days he compared the cellular reaction under the influence of the preceding application of calcium, thorium X, atophan, quinine and acetylsalicylic acid with that in-

duced in the control animals. He pointed out that the migration of the cells was more or less remarkably diminished after such procedures, and that the histiogenous reaction sometimes predominated. The strongest effect was found after the application of thorium X.

The first objection concerns the test experiment with benzol, as this substance has an extremely aleucocytic effect; although a dose of 0.02 c.c. seems to be very small, it is considerable in comparison with the weight of a mouse. Discussing his control experiments, Wallbach himself stated that the leucocytes and lymphocytes had already disappeared on the second day after the benzol injection, while an accumulation of histiocytes and fibrocytes was present. The main question arises as to why the leucocytes and the lymphocytes should have disappeared at so early a date. The answer is obvious. Under the influence of the benzol the white cells are absent, either because they are prevented from leaving the hæmopoietic organs or because these organs have directly been injured by the benzol injection.

Further, the writer knows from his own experience that mice are not suitable animals for use in the investigations in question. It is impossible to count the blood repeatedly and systematically; a count of white cells from smears of bone-marrow gives very poor results; even from complete sections through the bone-marrow with a good aspect exact conclusions cannot be drawn, because the sections are too small. In addition, we know that under normal conditions at different points in the connective tissue the number of the histiocytes varies considerably, and in view of the very small sections obtainable in mice it seems very difficult, if not impossible, to identify certain areas. Unfortunately, Wallbach does not give any information as to the technique he employed, whether serial sections or *in toto* preparations were made, what the staining methods were, and how he was able to construct a curve of the average figures for the different types of inflammatory cells. Considering all the objections stated, it seems rather questionable whether this investigator's conclusions are justified on the basis of the slight differences found in the number of the cells.

It is not the aim of this paper to deal with the pharmacological problems, with which the experiments discussed above are concerned. It may be mentioned however that thorium X, like benzol, has a damaging effect on the blood and the hæmopoietic organs. The strong "anti-inflammatory effect" Wallbach noted may be due to the complete destruction of the last remnants of white blood cells and hæmopoietic tissues.

The question now arises as to how the anti-inflammatory effect upon the vessels is to be explained. Wallbach discusses the possibility of a closure of the pores of the endothelium of the vessels or of an influence of the central nervous system. Especially he has the idea that in accordance with the results of recent investigations an anti-neural effect must be combined with an anti-inflammatory one. He says: "Car l'effet névralgique d'une substance doit se produire simultanément avec l'effet empéchant l'inflammation, puisque, comme nous le savons par les expériences plus récentes, une influence sur l'inflammation proprement dite peut être s'exercer par la voie du système nerveux central."

Klemensiewicz,[5] many years ago, discovered that the reactive processes and the behaviour of the vessels in inflammation are regulated by nervous influences. He supposed that vaso-dilatation is produced by a neuro-paralytic effect, while Ricker[6] and other authors assumed that it is due to neuro-stimulation. The more recent experiments of Groll[7] have confirmed the interpretation of Klemensiewicz. The opinion generally prevails that the dilatation of the vessels in inflammation results from a paralysis of the vaso-constrictors, that is of the sympathetic nerves fibres. At any rate, there is no obvious connection between the vasomotor action of the autonomic nervous system on the vessels on the one hand and the pain-producing action of centrally regulated nerve fibres on the other. Concerning the capillaries, which play the most important rôle in the migration of the inflammatory cells, the physiology of these structures is still so little understood that it has not yet been determined, whether they have their own innervation or even whether the endothelium has pores or not. All these gaps in our knowledge show how cautious and critical one must be in judging the possibility of anti-inflammatory effects through the action of chemicals.

The aim of this paper is to determine the conditions which investigations in this field must fulfil, particularly from the standpoint of a pathologist.

1. Large animals must be used.

2. A chemical substance which does not cause any damage to the inflammatory cells must be employed.

3. In addition, the effect of such a substance on the sympathetic or parasympathetic fibres of the vessels must be known.

4. The condition of the normal peripheral blood and the hæmopoietic organs, especially the bone-marrow, is absolutely necessary as a control.

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Case Reports

A CASE OF BONE SARCOMA TREATED BY COLLOIDAL ARSENIC*

BY A. C. HENDRICK, M.A., M.B., F.R.C.S.(EDIN.), AND E. F. BURTON, B.A.(CANTAB.), PH.D.(TOR.),

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Toronto

The patient is a young woman, eighteen years of age, and for the following history we are much indebted to the family physician. This patient in February, 1934, while skating received a cutaneous wound over the left knee which required several sutures. Recovery was uneventful until the latter part of April, when she commenced having pain in the outer part of the knee. The pain was severe enough to make her limp.

Examination at that time revealed nothing more than a little tenderness over the lateral condyle of the left femur. With heat and bed rest the knee rapidly improved, and she carried on her usual activities with only occasional transient recurrence of slight pain.

She went through the early part of the summer without any trouble, but late in August, after a particularly strenuous day, she developed very severe pain in the knee and again took to bed. When seen at this time there was a great deal of fluid in the joint and considerable wasting above and below the knee. X-ray examination was immediately made and showed the typical picture of an osteogenic sarcoma. The lung fields were clear. A course of deep x-ray treatment was prescribed and carried on daily from September 5 to 29, 1934. Following this, after a consultation with other physicians, amputation preceded by biopsy was advised. The patient was then taken to the Mayo Clinic for a further opinion. They concurred in the diagnosis of osteogenic sarcoma and in the treatment which had been advised.

The patient was brought to Toronto on October 18th. Fig. 1 is a photograph of a film taken at the Mayo Clinic on October 8, 1934. Further films were made here on October 19, 1934, and Dr. A. C. Singleton, senior radiologist of the Toronto General Hospital, sent us the following report.

"Films (No. 29470) were made of the left thigh and knee in the antero-posterior and lateral directions, providing a satisfactory view of the lower half of the femur, the upper third of the tibia and fibula and the patella. Here the patella, tibia and fibula present no evidence of pathological bone change.

"The femur presents definite pathological change, involving the lateral and postero-lateral aspects of the lower end of the diaphysis and proximal part of the epiphysis. The epiphysial line has fused. The changes here consist of a concentric area of cortical and subcortical bone destruction over an area about 3½ inches in length, over which there lies a fusiform soft tissue swelling about ¾ to 1 inch in thickness. In the soft tissue swelling there can be seen radiating spicules of new bone formation which have been laid down in lines at right angles to the shaft of the bone. There is slight periosteal lipping and periosteal spur formation at the upper end of the area of pathological change.

"Summary.—From a study of the films the findings in this femur are in my opinion those of primary malignant new growth of bone. From the character

* A paper read in outline by Prof. E. F. Burton, at the 10th Colloid Symposium held at Cornell University, June 19, 1935.

of the changes present I would feel that we are dealing here with an osteogenic sarcoma. There is no evidence of pathological change involving the parenchyma of either lung at this time.''

Colloidal treatment was commenced October 19, 1934, and on December 31, 1934, another set of films were made (No. 33850) of which Fig. 2 is a sample, and the following report was made by Dr. A. C. Singleton.

''Films were made of the left knee in the antero-posterior and lateral directions and these have been carefully compared with previous films of this patient made on October 19, 1934 (No. 29470). In the previous films changes were noted involving the lower third of the left femur which were interpreted as being due to osteogenic sarcoma. In the present films the fusiform soft tissue swelling previously present on the postero-lateral aspect of the shaft of the femur in its lower third has definitely decreased in size, associated with an increase in bone production in the tumour. The area of destruction of the shaft is no greater, and there appears to be some bone regeneration around the edges of this area of bone destruction.

''Summary.—From a study of the films there has been a decrease in size of the extra-osteal soft tissue tumour and an increase in condensation since the last x-ray examination.''

The treatment was continued, and again on March 22, 1935, another set of films was made, and the following is a copy of the report by Dr. Singleton.

''Films (No. 39188) were made of the left thigh in the antero-posterior and lateral directions providing a satisfactory view of the lower half of the femur and the knee-joint. These films have been carefully compared with the previous series made on this patient on October 19, 1934, and on December 31, 1934.

''The previous films showed a lesion of the lower end of the left femur which presented the characteristic appearance of an osteogenic sarcoma. The last set of films showed a definite improvement in the lesion, in that the irregularity of the bone was smaller in extent and a definite degree of recalcification in the lesion had occurred. In the present films there is I believe, continued slight improvement.

''Summary.—The findings in my opinion are those of an osteogenic sarcoma of the lower end of the left femur which has shown continued improvement since the first series of films, and in which there is at this time a slight but definite improvement over the last set of films.''

Treatment was further continued and another set of films was made on May 22, 1935, and Dr. Singleton reported:

''These films have been carefully compared with previous series of films, particularly with the last previous set made on March 22nd of this year (No. 39188). The series of films showed pathological changes on the postero-lateral aspect of the lower third of the left femur and the diaphysis of the shaft presented the characteristic appearance of osteogenic sarcoma. Throughout the series of films there was noted a gradual but definite improvement in the lesion, in that there was disappearance of the overlying soft tissue mass, and regeneration of bone within the lesion, so that at the last previous examination on March 22nd, there remained only a very small periosteal tumour extending over a distance of about 2 inches, with an elevation of about ¼ inch above the surrounding shaft, with marked regeneration in the bone of the external condyle.

''In the present films there is noted continued improvement. There is definite decrease in the irregularity of the cortex on the postero-lateral aspect of the lower end of the shaft, and the bone in the medulla of the external condyle is assuming practically a normal appearance.''

Treatment was continued and a further set of films was made on June 12, 1935, of which Fig. 3, is a sample, and Dr. Singleton reported as follows.

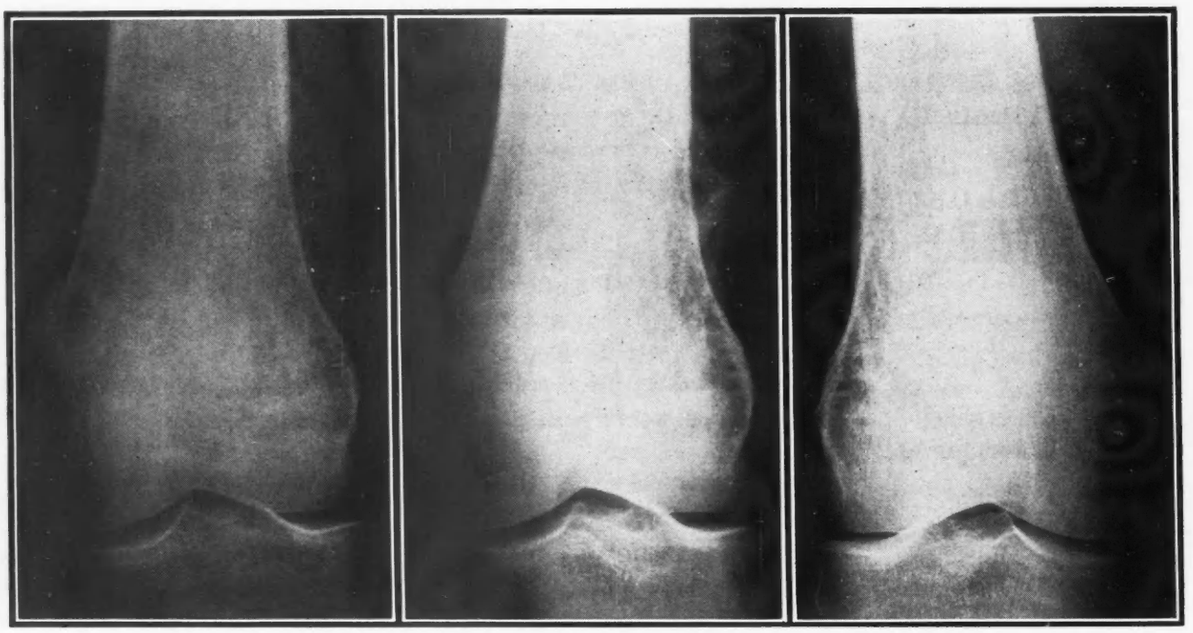


FIG. 1
October 8, 1934; anterior view.

FIG. 2
December 31, 1934; anterior view.

FIG. 3
June 12, 1935; posterior view.

"The films have been carefully compared with previous sets of films of this patient, particularly with the last series made on May 22nd, of this year (No. 42878). The original films showed a lesion involving the lower end of the shaft of the left femur and the upper border of the external condyle on the postero-lateral aspect, the findings presenting the characteristic radiographic appearance of osteogenic sarcoma. Throughout the series of films there has been a progressive decrease in the size of the extra-osteal mass and definite improvement in the bone quality within the lower third of the shaft of the femur and external condyle. At the present time there remains only a very slight mottling of bone throughout this region, associated with very slight subperiosteal new bone formation which at this time appears to be laid down in lines parallel to the shaft. In my opinion the present films show a slight but definite further improvement in the lesion as compared with those made previously. The stereoscopic films made of the chest at this time still show no evidence of metastatic new growth involving either lung or ribs."

The patient's general health has progressively improved since the beginning of the colloidal treatment in October, 1934. The wasting of the muscles of the left leg has cleared up, and the knee-joint functions normally. She has gained over twelve pounds in weight and walks considerable distances without any discomfort. In fact she looks well and feels well, and returned to her home on June 14, 1935, apparently cured.

Another case, that of a young married woman twenty-two years of age, was diagnosed in 1930 as being osteogenic sarcoma and she was similarly treated with the colloid. She now has a healthy baby-girl one and a half years old. This case was reported in this *Journal* (1933, **28**: 192).

To Dr. A. C. Singleton, senior radiologist of the Toronto General Hospital, who made the various radiographic reports and gave most valuable cooperation, we wish to extend our sincere thanks.

A CASE OF CARCINOMA OF THE ŒSOPHAGUS WITH RUPTURE INTO THE TRACHEA

BY C. E. BROOKS, M.D.,

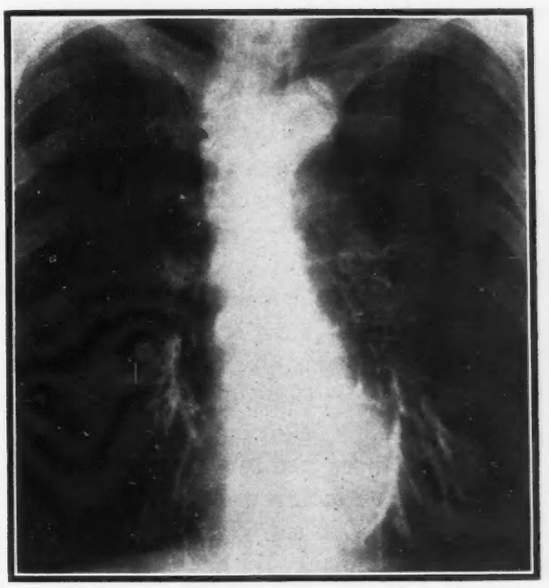
Lachine, Que.

The patient, a man of 66 years, was first seen on June 23, 1933. His complaints at that time were that he had difficulty in swallowing solid food; he felt a lump in the throat and it was necessary to swallow several times to force the food slowly down.

His past and family history were unimportant.

Examination showed a man of about the age stated; weight, 128 lbs.; rather thin, although he had only lost about 5 lbs. in weight in the past year. He was not dehydrated. Nothing suspicious was seen in the nose, mouth or pharynx, although on palpating the neck the region about and behind the larynx seemed a little enlarged and harder than usual. There were no palpable cervical glands.

Under the fluoroscope the barium drink given passed uninterruptedly down to the stomach. A skiagram of the chest showed no mediastinal glands, and the lung tree was clear on both sides. Œsophagoscopy revealed in the upper third a red hypertrophied area on the posterior



wall, although not enough to cause obstruction. A snipping was not taken for fear of exciting too much bleeding. A diagnosis of cancer of the œsophagus was made. The patient was put on a concentrated semi-solid diet, and the relatives were instructed to keep a bi-monthly check on his weight and report at once any loss in weight or the onset of any new symptoms.

The patient was seen periodically and seemed to progress fairly well. In October, 1933, however, swallowing became definitely more difficult, and he was put on a fluid diet of some 2,500 calories per diem. This he handled well and his weight kept at 127 lbs. until October 10, 1934, at which time he developed a "cold on his chest". He was badly cyanosed. He could not take even a drink without experiencing a severe fit of coughing, and stated that he had been able to swallow his food with difficulty until the evening before, when he noted that everything he took caused him to cough and that he was

very dry and felt quite weak. He was sent immediately to the hospital, given 1,500 c.c. of 5 per cent glucose-saline intravenously, fluoroscoped and x-rayed. On his drinking the barium we noted that it passed unobstructedly down to a point above the bifurcation of the trachea, then suddenly appeared outlining the bronchial tree on both sides. This produced a violent attack of coughing. X-rays showed clearly the bronchi outlined by barium. He was then postured, with the head of the bed lowered, given 5 per cent glucose-saline, both by intravenous and Murphy drip methods. Everything by mouth was withheld and he was instructed not to attempt even to swallow his saliva. By morning he was in better condition; his colour was good and he was not so dehydrated. His weight was 115 lbs., a loss of approximately 10 lbs. in two or three days.

Under a medium dose of avertin and local anæsthesia a gastrostomy was performed by the Witzel technique, the tube being placed as high into the fundus of the stomach as possible. He was returned to the ward in good condition, and 500 c.c. of 5 per cent glucose-saline were given intravenously every 8 hours. Feeding by the tube was started within three hours after operation. He was first given two ounces of a mixture of milk, eggs and lactose every three hours, with a minimum of 1,000 c.c. of boiled water during the twenty-four hours. Within forty-eight hours he was placed on gruels and strained soups. He ran a slow pulse and sub-normal temperature, and left the hospital on November 7, 1934, weighing 105 lbs. On leaving the hospital he was placed on a diet of 3,000 calories for the twenty-four hours and a daily intake of 1,500 c.c. boiled water. On this he gained in weight and strength. The gastrostomy wound did not leak, and the pulse and temperature rose to normal as he gained strength. He remained in comparative comfort until March 7, 1935, when he developed a rather severe hæmorrhage and died on March 12, 1935, of a terminal pneumonia due to the inhalation of the blood.

This case is of interest not only because of the pulmonary complication which occurred but for the fact that the patient survived some five to six months after the onset of this pulmonary complication. This, I believe, was due to the early performance of a gastrostomy while the patient was still a fair surgical risk, and also to his cooperation after the operation.

A BULLET IN THE ORBIT*

By G. Edward Tremble, M.D.,

Montreal

The unusual history and method of removal of a foreign body from the orbit were considered of sufficient interest to warrant reporting the following case.

J.B., a boy of 14 years, was admitted to the Montreal Neurological Institute on November 18, 1934, with the following history. Twenty-four hours previous to his admission he and a friend borrowed a 22-calibre rifle and went shooting. In attempting to lie down to shoot at a paper target he must have touched the trigger, because "the gun suddenly went off". The boy was knocked unconscious for a moment or so and was picked up by his friend.

On regaining consciousness he said that "blood started to come from my mouth and the left side of the nose. I walked home, a distance of two and a half miles, feeling all right except for a little pain in the left eye and lower lip". His left eye became swollen and discolored shortly after the accident. There was no history of dizziness, convulsions, headache or drowsiness. His physician, Dr. J. D. Dixon, of Lachine, referred him to Dr. A. G. McAuley on account of the eye symptoms. During the automobile drive on the way to the hospital the patient vomited once.

The personal and family history contained nothing important.

Present condition.—There was a punctured wound in the lower lip just to the right of the mid line. The course of the bullet was upward and oblique, because on examining the hard palate an opening was seen to the left of the mid line, three-quarters of an inch behind the incisor teeth. There were marked swelling and ecchymosis about the left eye, and the lids were so swollen that the patient was unable to open his eye. Considerable conjunctival hæmorrhage was present, especially on the lateral side, with proptosis of the eye. The pupils were equal. There was limitation of movement of the left eye, which was more marked in the upward and lateral directions. Dr. A. G. McAuley examined the eye and could find no evidence of intra-

* Presented before the Oto-Laryngological Section of the Montreal Medico-Chirurgical Society on December 13, 1934.

ocular hæmorrhage. The vision on admission showed O.D. 20/20, O.S. 8/20. Diplopia was present. No corneal anæsthesia; no deafness; no nystagmus. The movement of the soft palate was normal. The tongue was protruded in the mid line. There was no evidence of any injury to the cranial nerve. The ear drums were normal. The nose showed a blood clot on the left side. All other organs were normal. The Wassermann test was negative, to plus minus.

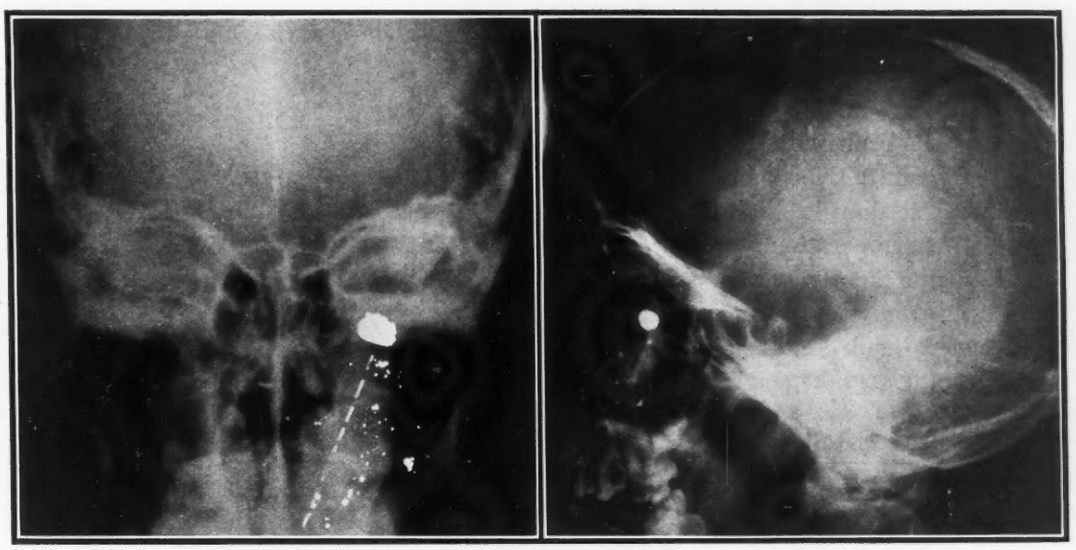


FIG. 1 FIG. 2

The dotted line indicates the track of the bullet.

On his admission to the hospital x-ray's were taken and the report was as follows: "Bullet present in the floor of the left orbit. Its track lies through the hard plate and left antrum." The procedure to be adopted was fully discussed, namely, whether or not to leave the bullet alone and see if infection developed, the advisability of opening into the floor of the orbit through the cheek, or removing the foreign body by way of the antrum and the floor of the orbit. The latter procedure was finally decided upon because no scarring would result, dependent drainage could be established, and the flecks of lead in the antrum could easily be removed with the blood clot.

Operation.—Under avertin and light ether anæsthesia the left antrum was entered through the canine fossa in exactly the same manner as for a Caldwell-Luc operation. The antrum was found to be filled with blood clot and small particles of lead. On removing the contents of the cavity the track of the bullet could be traced through the floor of the orbit. The opening in the floor of the orbit was enlarged and the orbit probed. During the procedure it was necessary to remove some of the orbital fat, because it kept falling down and filling in the opening. Unable to locate the bullet by means of the probe, the opening was again enlarged until it measured over half an inch in diameter. A small curette was inserted along the track of the bullet, but this also proved unsuccessful. It was finally decided to remove the patient to the x-ray department and locate the bullet under the fluoroscope. In the antero-posterior position no foreign body could be seen, but in the lateral view the bullet was seen to move in front of the probe. A pair of Luc forceps was inserted alongside the probe, and, again guided by the fluoroscope, the bullet was removed. The patient was then taken back to the operating room and the usual opening made into the antrum through the nose under the left inferior turbinate. A small gauze drain was placed in the antrum and the wound in the canine fossa left open. At the conclusion of the operation there was a slight enophthalmos.

Dr. McAuley's note on February 15th was as follows. "With the exophthalmometer the movement is practically alike for each eye, the anterior surface of the cornea possibly being a fraction of a mm. further back than the right. There is no apparent squint and only on looking down does he get any diplopia. He has also recovered his power of accommodation, and with the left eye the patient can now get a vision of 6/6 and

can read fine newsprint without the addition of any sphere.'' The final examination of the patient showed no diplopia whatsoever.

In summing up this case one might reach the following conclusions. (1) The opening through the canine fossa, the antrum and the floor of the orbit, seemed the logical approach, because dependent drainage was established, the old blood clot was removed, which in all probability would have become infected, and no scarring resulted. (2) Although it was thought that the enophthalmos present following the operation would increase as the support of the orbital fat was removed, this has not been the case. (If this had happened it was planned to fill in the gap in the floor of the orbit with rib cartilage at a later date). Evidently the opening filled in with fibrous tissue as it does in the canine fossa in the radical antrum operation. (3) Lastly, the importance of the fluoroscope in such a case cannot be over-estimated. Groping blindly in the orbit is not without danger, while under the guidance of the x-ray the removal of a foreign body is quite a simple procedure.

LICHEN PLANUS VERRUCOSUS WITH ZOSTER-LIKE DISTRIBUTION*

BY WILLIAM E. ECCLESTONE AND NORMAN B. GWYN,

Toronto

Lichen planus is usually described as an eruption of small shining inflammatory flat papules, polygonal in outline, and of dull red or violet tint. The majority of cases conform more or less to this description, and create but little difficulty in their diagnosis when the lesions are of small size and of more or less recent origin. At times, however, the distribution and the picture show variations which may be puzzling. Vesicles and bullæ may be met with. Instead of forming plaques the papules may form large rings up to three-quarters of an inch in diameter, and it is stated in some of the text-books, ''that in rare instances the eruption is limited to the area supplied by one or more of the cutaneous nerves of the trunk or extremity.'' That a distribution along a nerve course is considered of interest may be deduced from the fact that there were several plates reproducing this special picture in the collection given by the late Sir Stephen MacKenzie to the London Hospital Medical College. (Sequeira).

Lichen planus verrucosus, or lichen hypertrophicus, presents a wart-like elevation of the skin and the lesions are covered with masses of horny adherent scales. The colour of the eruption in its various forms seems to remain more or less of the characteristic lilac tint. Not infrequently a linear lesion may follow the line of a scratch mark. A further characteristic of

lichen planus, described by most authors, is the appearance on the surface of the lesions of opalescent areas or striæ forming a fine network. These markings were first pointed out by Wickham. Careful examination will usually show that aggregations of the smaller-sized papules go to make up the large patches, and the typical shining flat-topped papules can usually be demonstrated at the margins of the scaly aggregations.

The case in question, a photograph of which is reproduced, was that of an Imperial soldier who stated that he had first noted the condition on the skin of the back of his leg in 1924. It was of interest that it seemed to develop just below the point of entry of a bullet into the region of the sciatic nerve, and at first glance

* From the Dermatological Clinic, Department of Pensions and National Health, Christie Street Hospital, Toronto.

it would seem as if the eruption had traced itself out on this nerve's distribution. The curiously localized lesion, with its hypertrophic scaly appearance, gave rise to the suggestion that perhaps a tubercular syphilide had developed along the course of a damaged sciatic nerve. A negative Wassermann test would seem to rule out this possibility, and one's inclination next was to consider that the lesion was one of lichen planus of rather interesting and unusual distribution. Dr. D. King Smith concurred with this view. The fact, moreover, was elicited that considerable itching had been present. The question of a syphilitic origin of the lesion was therefore laid aside. The photograph shows well the remarkable distribution of the eruption and its curious warty appearance; white striæ cannot be made out in the photograph. There were no patches elsewhere on the body surface and none on the mucous membranes. It is early as yet to speak of any results of treatment. One knows, however, that, even if running a very chronic course, the lesions may completely clear up. Local applications in which liquor plumbi, liquor carbonis detergens, bichloride of mercury, phenol, menthol and thymol are present have been found useful. X-ray treatment is often applied to the chronic patches. Antipyrin and salicin are useful in controlling inflammation and itching. We hope to report further on this case at a later date.

Editorial

PLEURAL SHOCK

IN his paper on "Pleural Shock", published in this issue, Dr. Hamilton brings forward a curiously intriguing problem. Pleural shock is rare; it is extremely disquieting even when it is not fatal; its causation is obscure. And yet it is an incident which is likely to occur to many physicians now that artificial pneumothorax has become so widely used. Dr. Hamilton reviews the whole subject admirably. He points out how little is known of the mechanism underlying this type of shock, and makes it clear that no theory has yet been advanced which takes full account of all the facts. Cocke's recent paper* on the same subject is even more avowedly sceptical of present theories. The two main views are (*a*) that the shock is due to air embolism; (*b*) that it is the result of a reflex set up by pleural irritation. These probably will have to borrow from each other to fit the needs of the problem; as Cocke says:

> "That air embolism is a real occurrence I do not for a moment deny. That it further produces a syndrome quite similar to pleural shock is obvious . . . . I repeat, however, that at present I believe that it is quite probable that shock from air embolism is probably a rather rare occurrence, whereas shock from pleural irritation is probably a relatively common occurrence."

We can at least be forewarned. There seems little else that we can extract from the situation; unless it be that the very least complaint from the patient undergoing collapse treatment should be carefully heeded —more particularly that ominous one of "feeling queer". There should also be a more complete pooling of experience, for there is little doubt that more cases occur than are reported. H. E. M.

*Cocke, C. H.: Pleural Shock, *Am. Rev. Tub.*, 1931, **31**: 408.

THE DEPOPULATION OF THE SOUTH PACIFIC ISLANDS

ONE of the most familiar, possibly also one of the most melancholy, facts in history is the disastrous effect on health that has followed the opening up of new countries by European pioneers. The North American Indian race bears sad witness to the ravages of the small-pox introduced by the early Western explorers, a reversal of this fate being the carrying back of syphilis or the great pox, from the New World to the Old. Similar consequences have occurred in the case of the natives of the Pacific Islands, that immense area lying to the north and east of Australia. They are admirably discussed by S. M. Lambert in a paper prepared under the auspices of the Inter-

national Health Division of the Rockefeller Foundation.* How much, he asks, have the Pacific native races suffered since the European contact began? Has this decline in numbers been due to the diseases which were supposed to have come in with the white man, or is it an inherent process of degeneration and decay, as some claim? There is little doubt that these native populations were immensely greater one hundred and fifty years ago, that is at about the time of Captain Cook's voyages. The population of Tahiti, *e.g.*, estimated by Cook at 204,000, has shrunk to 9,072.

But Lambert insists that the situation should be viewed as a whole; there has been too great a tendency to judge the whole Pacific area by isolated instances. He speaks optimistically of conditions in American Samoa and the British colonies of the Cook Islands, Fiji, Western Samoa and Tonga, and amongst the Maoris of New Zealand. The native races here are vigorous and are eager to improve, and the various governmental and missionary agencies are learning not to make the native man's way of life conform with that of the white man so much as to get them to deal with the altered conditions induced by Western contact.

There is no doubt that the natives are slowly beginning to increase in areas which up to thirty or forty years ago showed sharply diminishing numbers. Take Samoa for example. The first available estimate of the population is that of Commodore Wilks in 1838, who put it at 45,000. For the next fifty years there was a rapid decrease, as in 1886 the number was 29,000. Then the tide turned and in 1932 the number was back to 44,000. One of the chief factors in this was a brilliant public health campaign between 1923 and 1927, in which immense efforts were made to improve public health.

A great deal of statistical material is presented to show that this upward tendency in numbers is evident in many other islands. The key of the situation is control of disease and the various means of dealing with it, such as by training natives in medicine, and increasing public health efforts are undertaken. But the difficulties are almost overwhelming in some parts. At any rate Lambert makes a strong case to show that the decay of the native races is not any mysterious, inevitable process, but one which has resulted from disease, and that it can be and in some parts is being dealt with by medical efforts, both preventive and curative.

H. E. M.

*Depopulation of Pacific Races. S. M. Lambert. 42 pp. Pub. by Bernic P. Bishop Museum, Spec. Pub. 23.

Editorial Comments

A New Treatment for Cancer

Much interest has been aroused, both in lay and medical circles, in a new treatment for cancer devised by Dr. Hendry C. Connell, of Kingston, Ontario, which he has been trying out during the past four or five months. We are sure that a detailed statement on the matter will be welcomed by our readers. We therefore wish to draw particular attention to Doctor Connell's paper entitled "The study and treatment of cancer by proteolytic enzymes", which appears on page 364 of this issue. It is of the nature of a preliminary report, and it is expected that further communications will be made on the matter as the investigation develops.

So many cancer "cures" are being reported these days that the medical profession at large has developed an attitude of horrid incredulity in regard to them, to the extent that it is almost impossible for the research worker who has a new idea to bring it forward with any hope of having it judged on its merits. We are glad to know that Doctor Connell is in a more favourable position. He has associated with him a number of men of high repute in the profession, representing various aspects of medicine, men capable of weighing evidence, so that we are sure his work is being thoroughly and scientifically carried on, and his conclusions, whatever they may eventually prove to be, will be accepted as accurate. Those who have seen the cases of cancer under his treatment have been impressed with the results he can show, which, to say the least, are encouraging. Certainly, his work cannot be lightly passed by.

In the paper published here Doctor Connell, who is an eye specialist, narrates how he came upon the idea of treating cancer by means of proteolytic enzymes as an outcome of his experimental studies on the cataractous lens, an

account of which was given in the February number of this *Journal* for 1934. He was able, through the action of a certain proteolytic microorganism, to produce an enzyme, having some degree of specificity, which would act on lens protein. The idea occurred to him that he might apply the same principle to the problem of the treatment of cancer; he might be able, in short, to produce in a similar way an enzyme or such-like agent which would act only on cancer cells. In this quest he has succeeded. Doctor Connell gives in detail the method by which he has accomplished it. Very properly, at this time he does not enter into the question as to the nature of the fluid he has prepared. As he says, what is of vital interest is what happens in the cancer patient when such a solution is injected into the system. Until the fluid has finally proved its merit it would be idle to waste time in speculating as to what it is and how it acts. There are many and abstruse problems connected with this part of the subject.

Doctor Connell gives the case histories of thirty patients treated (with one exception) by his method. The first two presented spectacular improvement; most of the others showed good though less striking results; and in some few no benefit was derived. He gives a straightforward account of his cases, whether the results were good, indifferent, or bad. In justice to Doctor Connell it should be stated that his cases were of the desperate kind, those regarded as beyond the help of surgery or radiation. Consequently, his apparently successful results should be given a higher rating than they might seem to deserve at first sight. Even with a cure which could properly be termed "specific" no doubt many cases of severity and in the late stages would not respond. The degree of amelioration which he has obtained is distinctly encouraging and clearly demands that his work be continued.

Doctor Connell does not make extravagant claims for his treatment. He says: "In the group of cases at present under observation the effects are consistently good. There has been a marked gain in weight, with disappearance of severe cachexia. Visible growths have shown arrest, with softening and absorption. In the cases where pain has been a prominent symptom the sedatives have been cut in half and in many cases discontinued. In the internal growths a similar process is apparently going on, since a great deal of clinical improvement has been noted.

"It is altogether too soon to assess the ultimate value of the method. Weeks to months must elapse before we can determine if the cancer masses continue to show shrinkage and absorption till their complete disappearance. Clinical evidence so far leads us to think that such disappearance may occur."

While the mode of preparation of Doctor Connell's cancer "ensol" has been divulged, we are glad to learn that steps have been taken to prevent the exploitation of the public and the profession by unauthorized interests. Certainly, the time has not come when this form of treatment should be generally adopted. Much more work must be done before this would be justified.

For the present, the dosage of "ensol" is a matter of empiricism. Experience will tell what is the safe and proper amount. It must be remembered that in the case of a remedy that causes cell destruction, as ensol apparently does, there is an added danger to life if the liberation of toxins is excessive. The production of severe toxæmia must, therefore, be avoided. Doctor Connell tells us that so far his ensol has been used both intramuscularly and intravenously without ill effects.

To sum up. Cases of cancer, properly diagnosed by microscopic examination, with adequate case-histories, are being treated with a solution which has solvent properties on cancer cells, and are being followed up. A number of competent men associated with Queen's University are collaborating with Doctor Connell, so that we can feel assured that the problem is being attacked from various sides in a thoroughly scientific manner. We bespeak for Doctor Connell all the assistance that the profession can give, and congratulate him on having developed a new line of attack on the dread disease, cancer, which has distinct promise. We shall await further developments with interest.

A.G.N.

The History of the Association

Some time ago it was decided that the history of our Association was worthy of formal compilation. The Association had been in existence for more than 60 years, which was a period long enough for review, and personal recollections of its earlier years were still available to some extent. Possibly, however, it was not fully realized by those who projected this history how entirely appropriate a time this was for it. This only became apparent as the history took shape. Then it was seen that there was much for the Association to learn from its past, and that it was at a stage of considerable need for such instruction. Its growth shows definite periods, and these did not all mark progress. For the first few years it flourished; then it entered on a level, uneventful period, by the end of which it had quietly but definitely declined to a very enfeebled condition. Then new energy was infused and a period of vigorous expansion followed. This ended in the year

1914, when the war struck hard at our very existence. After the war some degree of strength was regained, but by 1921 it was quite clear that this recovery was only partial; more, there was evidence of failing spirit. Then came the famous Halifax meeting and the re-birth of the Association. Reorganization, fresh energy, a general putting of the shoulder to the wheel —all contributed to the expansion which followed. Is it not evident now, however, that this notable expansion has reached a stage when we need fresh impetus to raise the Association to yet higher levels of effectiveness? If so, what better stimulus is there than in recalling the spirit of those who founded and nurtured the Association. The men who worked for it and carried it were actually very few in number, but their interest in the Association was passionately strong. They knew, none better, how unattractive Association work is to most medical men, for it is difficult to see through or past details of organization to the good that will result from it. More than all, they worked with no self-seeking in mind, or prospect of advancement, except of the general good.

It is hoped that the history will serve to emphasize these things, though, perhaps, not in so many words. If it does it will have fully justified the effort made to produce it.

The book is in the printers' hands and should be available in a few weeks. Further notice will be given in these columns as to where it can be obtained. H.E.M.

Dr. Griffith Evans's Hundredth Birthday

It is not given to many to pass the hundredth milestone as reckoned in years. The subject of this note had this distinction recently, when he received telegrams from the King and Queen and the Prince of Wales, congratulating him on the event.

Doctor Evans has a special interest for us in Canada, as he received his degree in Medicine from McGill University and, in Toronto, formed associations with Osler and Bovell, with the former of whom he maintained a life-long friendship.

Griffith Evans was born at Towyn, Wales, on August 7, 1935. He was primarily a veterinarian, being admitted M.R.C.V.S. as long ago as 1855. He also had military affiliations and was one of the first to be sent out to Montreal as an army veterinary surgeon in 1861. He travelled to Canada on that occasion by the famous *Great Eastern*. During the period of the American Civil War he had personal relations with Abraham Lincoln, who allowed him to go to the war zone on condition that if his services were needed he would look after the wounded. Evans, accordingly, spent a short time (some two months) in the United States in hospital work. Though continuing as a veterinary surgeon he prosecuted full medical studies at McGill, qualifying in 1864. He must be the oldest living graduate of McGill. He returned to England in 1870, at the time of the Franco-Prussian War, and, later, served in India.

As a scientist Doctor Evans has several titles to fame. In 1880 he identified the cause of "surra", a disease affecting horses and camels in India, as a trypanosome, which was named after him, first, erroneously, as a spirochæte, by Steel (*Spirochæta evansi*), then by Crookshank as a trypanosome (*Hæmatomonas evansi,* and, later, *Trichomonas evansi*), receiving its present name, *Trypanosoma evansi,* from Chauvrat in 1896. This work of Evans led to a renewed interest in the trypanosomes which was destined to bring about fruitful results. In this connection we may say that in the Bibliotheca Osleriana Osler has this note under the entry on Surra.

> "When I was a student with Bovell at Toronto, 1868-9, Griffith Evans, who was stationed there as veterinary surgeon to the Artillery, was much interested in the microscope, and frequently came to Bovell's rooms to help in the preparation of specimens. He had previously been stationed in Montreal, where he graduated in Medicine in 1864. When serving in India he made the discovery of the parasites in the blood in Surra—the first trypanosome disease to be described.
>
> On his retirement he went to Bangor, where he still lives, a hale, hearty octogenarian. He sent this, and a book of photographs of famine scenes in India (no. 2565), 8 Jan., 1918.
>
> (Signed) Wm. Osler."

Eighteen years before Koch discovered the tubercle bacillus Evans taught that tuberculosis was an infectious disease and called for outdoor treatment. He also supported Spooner in his contention that tetanus was a specific fever that must run its course.

Evans has not been without honour, even in his own country. He was awarded the Steel Medal of the Royal College of Veterinary Surgeons, the Mary Kingsley Medal of the University of Liverpool, and the honorary D.Sc. of the University of Wales. He was also made a freeman of the City of Bangor.

On August 7th Doctor Evans was unfortunately confined to bed as the result of an accident, but was presented with a scroll by Sir Frederick Hobday on behalf of the Royal College of Veterinary Surgeons, and he received the mayor and clerk of Bangor, who conveyed to him the congratulations of his fellow citizens. The *British Medical Journal* announces that a carved plaque is to be set up in the Royal Veterinary College recording the fact that Doctor Evans has consented to "lead the veterinarians of the Empire in support of the College Hospital's 'Giant Nosebag 250,000,000 Farthing Endowment Fund'." McGill

graduates all over the world will desire to join in congratulating their distinguished confrère, and medical men all over Canada will also be appreciative of Doctor Evans's work. A.G.N.

The Ninetieth Birthday of Sir Thomas Barlow

Not less noteworthy is the birthday of Sir Thomas Barlow, Doctor Evans's junior by but a paltry ten years, who has for long been an outstanding figure in pædiatrics.

Sir Thomas Barlow is at the present time, easily and by right, the doyen of British Medicine. Despite his years he has remained singularly vigorous, even youthful, in his outlook, and is still vitally and forcefully interested in medical matters and the problems of human betterment. But it is in the domain of pædiatrics, in particular, that his title to fame is secure. Harking back a generation and more, it may be remarked that while he was making his important contributions to medical science he had as contemporaries such outstanding figures as Hughlings Jackson, Sir William Gowers, Jonathan Hutchinson, Gee, Cheadle, and, in France, Charcot, Houchard, and Marie. These great men have all passed on, but Sir Thomas Barlow, with a more than ordinarily full life, has lived to receive the admiration and homage of a new era.

Sir Thomas's ninetieth birthday, which was on September 4th, was commemorated by the publication of a Special Birthday Number of the *Archives of Disease in Childhood* (1935, Vol. 10, No. 58), which is devoted to a consideration of the subjects especially associated with his name—infantile scurvy and rickets—together with ancillary topics. The original paper by Barlow, entitled "On cases described as acute rickets", which appeared in the *Medico-Chirurgical Transactions*, of London, in 1883, is reprinted. The other papers presented are as follows: "Infantile scurvy: its history", G. F. Still; "Dr. Cheadle and infantile scurvy", F. John Poynton; "The isolation and identification of vitamin C", S. S. Zilva; "The recognition of scurvy, with special reference to the early x-ray changes", Edwards A. Park, Harriet Guild, Deborah Jackson, and Marian Bond; "Vitamin C and its effects on the structure of the teeth", A. T. Pitts; "Malnutrition and latent scurvy", Theodor Fröhlich; "The vitamin C content of the liver of new-born infants", K. U. Torverud; "Investigations into the pathogenesis of scorbutic dystrophy," Prof. P. Rohmer and N. Bezssonoff; "The anæmia of infantile scurvy", Leonard G. Parsons and W. Carey Smallwood. There is also an introduction by Lord Horder.

Canadian medical men in general join with their brothers in Great Britain in extending congratulations and giving homage to Sir Thomas Barlow. He is one of the great figures. A.G.N.

Special Articles

NURSING CARE IN THE HOME WITHIN THE PATIENT'S ABILITY TO PAY: THE VICTORIAN ORDER OF NURSES

BY ELIZABETH L. SMELLIE

Chief Superintendent, Victorian Order of Nurses for Canada,

Ottawa

The Victorian Order of Nurses for Canada aims to provide nursing service on a visit basis to people in their own homes. The organization has eighty affiliated branches. The branches enjoy local autonomy but accept the policies and professional standards of the national organization. Patients are expected to pay in whole or in part the cost of a visit whenever possible, but no case is refused because of inability to pay. Each year the unit cost per visit is computed. The average cost of a visit (1933) was 84 cents. The Victorian Order nurse cares for medical, surgical and chronic patients on a visit basis, but only under the direction of a physician; instructs the expectant mother in the care of her health; assists the doctor at delivery, and gives care to mother and baby throughout the post-partum period; supervises the health of mother and baby for six weeks at least; in some branches gives a school nursing service, conducts well-baby centres, mothers' classes, health league and home-nursing classes for girls.

In 1934 Victorian Order nurses made 725,378 nursing visits to 79,274 patients.

The National office offers a consultant service to the branches. Twice yearly, supervisory visits are made to all branches to ensure the maintenance of the required standards of nursing service. A branch is supported by fees from patients, by fees from insurance companies, by membership fees, by municipal grants and by funds collected from the public. Acting in co-operation with the National office, a branch is prepared to enter into contracts with insurance companies or business firms wishing to purchase visiting nursing service in the home for their policyholders or employees.

The Victorian Order endeavours to meet the special requirements of those patients who can be cared for in their own homes and who do not need the full-time service of a nurse. In these days when many people live in apartments it is often not convenient to provide living accommodation for the nurse. With a visiting nursing service available, patients can frequently be dis-

charged from hospital earlier than would be otherwise advisable, thus reducing the expense of illness either to the individual family or the municipality. Each new case reported from any source is visited, but nursing care is continued only under the direction of a physician. None but recent confinement cases and acutely ill patients are visited on Sundays or holidays. Except where an appointment service is available, only confinement and emergency calls are answered after five p.m.

The Victorian Order is not a woman's organization: its administrative bodies, locally and nationally, are composed of both men and women. Its field of nursing service is not limited to indigent cases or to mothers and babies. It is a general nursing service, available for men, women and children requiring such care in their own homes regardless of race, colour, creed or financial status. When there is only one nurse in a branch it is obvious that night calls must be limited to attendance at deliveries and emergencies. The larger branches are usually prepared to accept calls on an appointment basis at a slightly higher cost.

As hospitalization fluctuates and medical care is provided more generally in the homes a natural increase of work comes to the Victorian Order. It seems only reasonable to expect that financial responsibility for nursing care in the home on a visit basis would be provided for under any system of organized medical services. There is nothing in the constitution to prevent coordination of effort or enlargement of activity in cooperation with public health and medical organizations.

The Victorian Order of Nurses for Canada is a national organization, founded by Royal Charter in 1897. In spite of having had to weather a number of stormy periods the Order has been fortunate in securing the right leadership—public spirited boards, and capable, conscientious nurses. Twice there have been medical surveys, the first by Dr. Malcolm McEachern (1922-1923) and the second by Dr. Grant Fleming in 1930. The organization now presents the possibility of being further utilized should its potentialities be recognized and the altruistic spirit of its founders in facing new conditions and responsibilities be further emulated by their successors.

The work of the National Association is carried on by an Executive Council representative of the constituent branches. The Royal Charter was amended in 1926 to meet present day conditions. Victorian Order branches are directed by Boards representative of the best type of citizens. The policy is to secure the cooperation of the local Medical Association and to have medical advisory committees appointed by the Medical Association to whom can be referred professional problems. Each branch has a definite responsibility to the local health officer, the recognized authority in public health for his community.

Nurses are appointed by the branches only upon recommendation of the National office. Salaries are paid locally. For the past two years thirty-five has been established as the maximum age for admission. At the present time, there is no sickness or pension scheme. The fact that appointments are made locally only after recommendation by the National office is a protection, in that applicants can be referred to the National office and when, for any reason, a nurse does not fit into a local situation, she can be transferred or released as indicated. Apart from academic qualifications, suitability and genuine liking for district nursing are extremely important factors in assignment to duty. Many graduate nurses are not eligible because it is a requirement that Victorian Order Nurses shall have had a broad general training with good experience in obstetrics and pædiatrics, and preferably have had affiliations in communicable disease and psychiatry. Post-graduate training in community nursing has been considered an essential since 1898.

The Victorian Order, nationally, is affiliated with the Canadian Medical Association and has Provincial medical representatives on its Board of Governors, to each of whom is submitted yearly an itemized report of the work carried on within his Province during the preceding year. Also, there are a number of medical consultants to the National office whose appointment has been approved by the Executive Committee of the Canadian Medical Association. Victorian Order nurses are expected to be members of the Canadian Nurses' Association and registered in their Province.

In so far as the hospital is concerned, were the hospital and the Victorian Order Branch working hand in hand, a more effective follow-up plan could be worked out for patients returning from hospital, in teaching mothers how to care for their babies, doing surgical dressings, giving treatments, making the occasional visit to the chronic case and so on.

The services of Board members as publicists and as interpreters of the service could be much more generally utilized. In so far as development of the service is concerned, the possibilities are unlimited. The local boards determine the area to be covered. This could frequently be extended one mile or two miles, or even include a township, should finances permit. Boards and committees could be strengthened and broadened locally by the addition of more representative members of volunteer and professional groups; and certainly advisory committees, composed of representatives of the medical and nursing professions and of the Health Department, would prove most helpful.

Experiments, either independently or in cooperation with a local nurses' registry, might be made to provide all types of service needed in the home, including the practical worker sometimes required, who would in this way work under supervision.

Apart from its own special activities, the function of the voluntary organizations is to

pioneer and demonstrate. The Victorian Order has organization, a fine tradition of service, the goodwill of the people in the communities served, the principle of supervision accepted, with emphasis on continuous staff training. The Order is ready to go ahead.

One criticism of all health organizations today is that the public is not sufficiently well-informed of the need for and value of public health services. There is a tendency among professional groups to stand aloof or to be a little fearful of work being controlled, even if wisely led from the administrative viewpoint, by other than professional people. The experience of the Victorian Order is that where our Medical and Nursing Advisory Committees are keen and alert their advice on professional matters is eagerly sought and gladly accepted. The nursing service of the Victorian Order is under professional control and supervision, and visits are made only under medical direction. In this way cooperation is attained of the three groups most intimately concerned, the community, the medical, and the nursing professions. A very kindly feeling seems to exist toward the Order because of its usefulness throughout the past years and the readiness of its members to serve, whether in such emergencies as the trail to the Klondike in '98, the Halifax explosion, the various typhoid epidemics of some years ago, or in meeting the daily requirements.

The service of the Victorian Order has never been given great publicity nor has aggressive action been taken to establish branches. Apart from the nursing supervisors attached to the National office, there are no organizers. Any interested person or organization, or the medical profession, may obtain information from the National office, or secure a personal visit to discuss local visiting nurse problems without financial or other obligations.

Opportunities do not easily present for the Victorian Order to meet with medical men in larger groups or for discussing further possibilities of usefulness. Surely skilled nursing is essential to the welfare of the people and the provision of adequate medical care. However, unless at national, provincial or district medical meetings, occasional opportunities are presented for joint conferences and exchange of ideas, it is not going to be easy to have mutual problems solved or to expedite the provision of a more adequate and effective visiting nursing service in the homes of the people requiring it.

Medical Economics

COMMENTS ON THE PROPOSED HEALTH INSURANCE ACT FOR BRITISH COLUMBIA

By Bede J. Harrison,

Vancouver

In the proposed Act there are many points dealing with medical benefits to which objection can be taken on one ground or another, but the crux of the question lies in the opening lines of Subdivision 20, Part 3, Page 31, where it says that "medical benefits for insured persons which may be *provided* under this Act are:"

I would suggest that the *provision* of medical benefits is a matter for the practitioner and that all that the Government can do under the scheme outlined is to *provide money* to pay for the medical services which are provided by the medical practitioners. That this is so can be realized by considering any case of illness in a person insured under the Act. The doctor may give a great deal of medical service, but there is nothing in the Act to say that he will be paid for it all. In fact, the limitation of the total financial liability of the Government is a direct admission that the Government is supplying *money* only. It is also obvious that a doctor may supply medical services for which payment will be disputed by the Government, and from this fact also it can be seen that it is the physician who provides the medical service, and that the only thing which the Government provides is *money*. This concept would, of course, not hold if the Government were to undertake the training of medical practitioners and were to employ them as full-time officers with regular hours, rates of pay, holidays, superannuation, etc. Were the Government to undertake this training it might possibly be said to be providing medical service, because under such circumstances the full-time doctor would form an integral part of the Government. Until such time as the Government does this it can in no way be said to be providing medical services.

In order to convey my ideas clearly I would like to draw a parallel. Any form of insurance consists essentially of a contract between the insurer and the insured party, whereby the insured party, in consideration of certain moneys which he pays to the insurer, receives from the insurer certain other moneys which become due and payable to him when certain specially defined contingencies arise.

In the case of motor-car insurers the operation consists of the motor-car owner paying the insurance company certain moneys and the insurance company in consideration of these moneys supplying the motor-car owner with *money* when certain contingencies which are laid down in the policy arise. When the motor-car meets with an accident it is repaired by a motor-mechanic with whom the motor-car owner

forms an individual contract. The motor-mechanic has no contract with the insurance company, and the party liable to him for the payment of his account is the motor-car owner who brings him the work. The insurance company may or may not pay the motor-mechanic's bill, and if the insurance company fails to do so the mechanic still has the power to sue the motor-car owner for that part of the bill the liability for which the insurance company refuses to accept.

Transferring this idea to the question of Health Insurance, and replacing the motor-car owner by the patient, the insurance company by the Government, and the motor-mechanic by the doctor, the rationale of the system would consist in the patient entering into a contract with the Government under which the patient would pay to the Government certain moneys, in return for which the Government would supply the patient with money should certain contingencies arise in his own personal bodily mechanism—in short, should he fall ill. The patient consults the doctor and forms, thereby, with him another contract undertaking to pay him for services rendered. In due course the doctor sends his bill to the patient, and the Government, as the insurer, is called upon to meet the patient's bill, in the same way as the insurance company is called upon to meet the motor-mechanic's bill. In this way the personal contract between the doctor and the patient that exists at present is maintained, and the patient remains liable to the doctor for payment, even if the Government does not pay, in the same way as the motor-car owner is responsible to the motor-mechanic for his bill if the insurance company fails to pay.

The success of the motor-car insurance business has been due very largely to the introduction of the waiver clause, under which the motor-car owner undertakes responsibility for the payment of the first fifty or one hundred dollars worth of damage which his car may sustain. The insurance rate which can be obtained on a contract containing the waiver clause is such that most insurers accept this type of policy. The cost of a policy which does not contain a waiver clause is prohibitive, and the insurance companies would find it extremely difficult to carry on their business were the waiver clause to be entirely eliminated.

To ensure success for the proposed Health Insurance Act of British Columbia the introduction of a waiver clause appears to me to be necessary. This would mean that the patient would become responsible to the doctor for the payment of a certain amount, for his initial consultations (an amount which could be fixed, after actuarial consideration, at different levels for people in the different income classes, a patient in the hundred dollar class being held responsible to the doctor for a smaller amount than the patient in the two hundred dollar class) and this principle would keep the contractual relationship between the doctor and the patient much the same as it is at present, the patient having the right under his contract to sue the doctor for malpractice, and the doctor having the right to sue the patient for non-payment of fees. (Under the proposed Act, in the absence of any specific reference to the contrary, it would appear that the doctor can be sued by the patient for malpractice, but the patient cannot be sued by the doctor for non-payment of fees).

The basic idea of this scheme is that the patient assumes partial financial responsibility.

The principle of partial financial responsibility on the part of the patient is accepted by the proposed Act. On page 10 of the Introduction it will be seen that under item 2 the patient becomes responsible for payment for some hospital services, the Government not becoming responsible for it all. Under item 4 the patient becomes responsible for the payment in part for drugs, medical, surgical, and optical supplies. Under items 6 and 7 the patient is held responsible for certain nursing and dental services, and on the eighth line at the foot of page 10 it will be seen that the patient becomes partly responsible for looking after himself—cash benefits not being payable until after he has been disabled one week and not being payable for more than twenty-six weeks. This last sentence creates a position whereby a doctor can be called upon to give expert services to a patient whose cash benefits have been suspended under the Act, and who therefore may be unable even to buy food, the responsibility of the doctor persisting after that of the state has been discontinued. In fact the principle of the patient paying part of the expenses of medical benefits is recognized throughout the Act except in so far as it applies to the doctor and the laboratory services.

Elaboration of the principle can be seen by considering a few typical cases. A patient in the class with the ten-dollar waiver consults his doctor, whose consultation fee is five dollars. The patient is responsible for the payment for the first and for the second visits. Should there be no more visits the responsibility for payment rests entirely with the patient. Should the visits in connection with a particular illness extend to three, four, or more, then the insurance fund becomes responsible for all payment in excess of the ten dollars. Should the patient wish to consult a specialist instead of the general practitioner, and go directly to the specialist's office his ten-dollar waiver may be utilized in paying for the first visit. In view of the fact that the patient is expected to nominate the doctor whose services he would usually employ there will really be no opportunity for the patient to go "shopping", because the waiver

could apply to each fresh medical practitioner whom he visited. Again it will sometimes happen that a patient will demand excessive attention from his doctor, and occasionally it may happen that the doctor will give his patient excessive attention. Supposing in such a case as this a bill for one hundred dollars is presented (in the case again of a patient with a ten-dollar waiver). The patient is responsible for the first ten dollars. The insurance fund may say that out of the remaining ninety dollars only seventy dollars worth represented legitimate medical attention, and may pay the doctor, therefore, only seventy dollars. The difference, twenty dollars, then becomes a responsibility which the patient must meet and for which the doctor can sue him. Should the doctor have been guilty of excessive attention then he will probably be prepared to drop the matter, but if he feels that the patient has demanded the excessive attention then he will have his common law right to recover that twenty dollars from the patient. In still another case the patient may require a surgical procedure which the general practitioner is perfectly capable of carrying out and which the general practitioner would be paid for at the scheduled rate. The patient may insist on having the work carried out by a specialist. The specialist's account would be higher than the amount allowed on the schedule. The insurance fund would pay the scheduled amount and the specialist could recover the difference between his proper fee and the scheduled fee directly from the patient.

It has been objected to my suggestions that a person who pays his medical bills up to a certain amount will prefer to take the whole of the risk himself and will not insure under the Act, with the result that only the weakly people and those with chronic illnesses will insure. Were this so the fund would be very small and in addition the calls on it would be very great. In reply to this objection we may point out that it is the careful man who insures, whether it be his life, his motor-car, or his house. It is not only the weakly man who insures his life, it is not only the bad driver who insures his motor-car. If you examine your own records with regard to motor-car insurance you will find most probably that you pay your insurance regularly every year and that you have now paid very much more than you have ever received from the insurance company, notwithstanding the fact that the waiver clause has been present in every policy which you have bought. If there should be any differentiation between those who insure and those who do not insure it will be found that the careless man is the one who will not insure and the man who is careless about his insurance is probably also careless about himself. I do not think that the waiver clause will prevent people from insuring under the Health Act any more than it prevents them from insuring their motor-cars.

In motor-car insurance a repeatedly careless driver may be refused further insurance, and under the proposed Health Insurance Act a man's medical benefits may be suspended if he is responsible for any act which interferes with his treatment or retards his recovery. The part of the Act dealing with this is Subsection 2, Section 60. I think it would be a good idea if the Act were altered to read "An insured person persisting in such practices as in the opinion of the medical committee tend to render him specially liable to disease other than those diseases associated with his occupation, or tend to imperil the time of his recovery." The removal of chronic drunkards, drug addicts, and, so on, from the operations of the medical benefits could be procured in this way.

Chronic diseases, such as tuberculosis and mental disease, have been specially removed from the Act so far as hospitalization is concerned. They have not been specifically removed from the operations of the Act as regards medical services. It is in my opinion advisable that all chronic diseases should be removed from the operation of this Act and be brought under a special chronic diseases Act.

Section 70 points out that for the purpose of paying the costs of various benefits the fund shall be deemed one and indivisible, even though separate accounts of the money are to be kept. Instead of separate accounts being kept separate funds should be kept for the different services as the different benefits are brought under the operations of the Act. Cash benefits should never be included with medical benefits. Cash benefits for people who are out of work represent a separate and distinct entity, and should be grouped together, whether the cause of the citizen being out of work is illness, unemployment, depression, etc.; and the cash benefits should really form part not only of a separate fund but of a separate Act.

Throughout the Act it will be noted that there is an upper limit to the liability of the employee, to the liability of the employer, and to the liability of the Government, but there is no upper limit to the services to be demanded from the doctor. Before receiving any benefits the citizen becomes liable to the Government for payment for a period of two months, which means that he must pay 6 per cent of his monthly salary before coming under the operations of the Act or before the Government becomes responsible to him at all. It is only right to suggest that he should become responsible to the doctor for a minimum amount, as mentioned in the waiver clause, before he comes under the operation of the Act as far as medical services are concerned.

Clause 35 recognizes the liability of persons to pay money to doctors outside British Columbia

where such fees are in excess of the amounts scheduled under this Act. It appears only right that the principle should be incorporated whereby a patient can become responsible to a doctor in British Columbia for sums in excess of the amount scheduled under the Act.

Section 34 points out that a medical practitioner may be penalized by the commission denying him the right to serve insured persons. It is to be noted in this connection that the Government does not assume the right to penalize him for malpractice to the extent of recovering money from him so that the patient's rights for the recovery of money for damages as a result of malpractice is left undefined. Should the patient have the right to sue the doctor for malpractice, then the doctor should have the right to sue the patient for non-payment of fees. If the patient cannot sue the Government for malpractice on the part of the practitioner and the Government cannot (under the Act) recover from the medical practitioner it would appear that the patient's right to recover in a case of malpractice must be directed against the doctor.

There has been no definition of laboratory services.

It will make for greater facility of consultation between medical practitioners and specialists if the fees payable to doctors are lumped together in one sum instead of being divided as is suggested in the Act.

Great care has been taken in framing the Act to protect the finances of the insurance fund. This step has been taken primarily to overcome the difficulty of the Government being unable to satisfactorily budget for the expenses to which it may be placed by the Act. Bankruptcy of the fund is going to be avoided at the expense of those who operate under it, and no definition in the Act has been made as to the process whereby the fees payable to practitioners will be reduced as the amount of money remaining in the fund becomes less, nor is there any indication in the Act as to whether, should the funds run out, the medical practitioner will be expected to continue granting his services to the insured patients gratis, or whether the insured patient will automatically be removed from the reception of medical services in the same way as he will be automatically removed from the reception of cash benefit.

The ideas I have put forward in no way clash with the principles of the Act, and, in fact, only extend some of them, so that there appears to be no essential reason why some of these ideas should not be incorporated. The exact details would, of course, need close attention, but I think that the profession as a whole should make a very determined attempt to maintain the contractual relationship with their patients which exists at present, and should fight to the utmost any attempt which is made to make them servants of the Government.

Men and Books

NOTES ON THE MEDICAL HISTORY OF THE COUNTY OF HURON

BY THE LATE W. GRAHAM,*

Brussels, Ont.

The medical history of Huron begins in the days of mud roads, and no roads, in most instances only blazed trails through the bush. In the early "fifties" there was not a gravel road in the county. On most of the farms there was but small clearance; conveniences of life were very scarce, and money scarcer. Log shanties were very much in evidence, and cultivated fruit *non est.*

At this period the doctors in Huron were not numerous. There was Dr. Cole, a graduate of Dublin University, a genial Irishman, who possessed the confidence of the whole community. The doctor and his horse were known throughout the whole neighbourhood. His saddle bags held the whole of his armamentarium, which I daresay consisted chiefly of calomel and jalap, morphine, and a pocket surgical case, with perhaps a single-tube stethoscope. Other representatives of the profession about that time were: Drs. Dunlop and Shannon, of Goderich; Dr. Birtch, of Brucefield; Dr. Chalk, of Harpurkey; Dr. Reeve, of Clinton; Dr. Cowan, of Exeter.

By the middle "sixties" great advance had been made in the settlements. The gravel roads from Clinton to London, from Clinton to Wingham, and from Seaforth to Wroxeter, were completed. By 1870 the number of doctors had increased considerably, with the growth of population and advance in new settlements to the northern townships. Dr. Alex. Taylor settled in Goderich. In Clinton were Drs. Cole, Reeves, and Appleton; in Brucefield, Dr. James Stewart and Dr. Hurlburt; in Blyth, Drs. Carden, Thomson and Wm. Sloan; in Wingham, Drs. Peter MacDonald, Tamblyn and Towler; in Seaforth, Drs. Coleman, Campbell, Varcoe and Metherill; in Exeter, Drs. Hyndman, Cowan, Moore and Amos; in Manchester Dr. Moore; in Ainleyville, Dr. W. J. R. Holmes and Dr. Wm. Graham; in Bayfield, Dr. Stanbury.

About the latter "sixties" I do not think there was a fever thermometer, a Cannon's stethoscope,

* Dr. Graham was one of the early physicians in the County of Huron. He died in 1929 at the age of 85. The present notes were given by him to Dr. J. W. Shaw, of Clinton, who has kindly sent them to us through the Huron Medical Society.—[EDITOR].

or a microscope in use by the profession in Huron. Indeed, many laughed at the thermometer as a toy or plaything.

The Huron Medical Association came into being somewhere about the middle "seventies", through the efforts and leadership of Dr. James Stewart, of Brucefield, who afterwards became professor of materia medica at McGill College. Dr. Stewart seemed to be married to his profession; he was a careful and persistent student, a thorough diagnostician, modest and retiring in manner, loved and respected by the members of the Huron Medical Association, who presented him with a handsome gold Waltham watch on his removal to Montreal. The charter members of the Association were: Drs. James Stewart, John Campbell, Peter MacDonald, Wm. Sloan, A. Hurlburt, Alex. Taylor, Hodge, of Mitchell, Worthington, of Clinton, and Wm. Graham, of Brussels. Dr. Stewart was elected first president. The Association was instrumental in inducing many of its members to take great interest in the profession. I had the pleasure of accompanying Sir William Osler from Toronto to Hamilton just previous to his translation to Baltimore. Amongst other things he said:—"You must have some good men in Huron. I read your transactions in the journals. I have no hesitation in saying that you have the best medical society in Canada."

But the enthusiasm of our Association did not extend throughout the county as much as could have been wished. Soon after the London, Huron and Bruce Railway was opened the Society decided to hold one of their meetings in Exeter, and although interesting papers were read and cases shown not a medico from Exeter was present except Dr. Hyndman, Sr.

In 1883 the Ontario Medical Association suggested that Branch societies should be formed throughout the Province, and the Huron Society called a meeting in Palmerston, which was successful and well attended. The writer was appointed secretary, but owing to a year's absence in Europe the secretaryship was left in the hands of Dr. Yeomans, of Mount Forest. On my return I wrote to most of the medicos in the neighbourhood of Palmerston but only received answers from two. Thus the effort to establish a branch society proved abortive in that locality.

Dr. John Campbell, of Seaforth, was an enthusiastic member of the Association, seldom absent, a typical Celt, and well saturated with Scottish lore, particularly with the life of Robbie Burns. He eventually moved to Brooklyn, N.Y., and while there was invited to address the Caledonia Society of Newark on "Burns". The President, Dr. S. E. Robertson, told me that the Society had never heard the equal of it in all its history.

Dr. Wm. Sloan, another standby, was one of the most genial, lovable souls possible. He took a genuine interest in the Association, and was thoroughly honest with his patients; humbug was foreign to his character. He eventually moved to Toronto, where he received the appointment of surgeon to the Central Prison at Toronto.

Dr. Peter MacDonald, of Wingham, was another of the stalwarts who was a valued member. He did not attend as regularly as some others, but at the same time was an acquisition to the society; he was an able debater and always possessed reasons for the faith that was in him. He was a good deal of a politician. He represented East Huron for many years in the Dominion Parliament as Deputy Speaker, and received as reward the postmastership of the City of London.

Association Notes

The Meeting at Atlantic City

PROCEEDINGS OF SECTIONS

THE SECTION OF SURGERY, GENERAL AND ABDOMINAL

This Section was under the joint Chairmanship of Dr. John L. Yates, of Milwaukee, and of Dr. W. E. Gallie, of Toronto. Under the inspiration of Dr. Yates an innovation was introduced into the conception of what should enter into the program of a surgical section. While the practical aspects of surgery were not overlooked, more attention than usual was paid to certain basal factors of a physiological and pathological character which govern the evolution of surgical conditions and indicate the proper direction which surgical treatment should take. Accordingly, such subjects as the blood and lymph, the blood and lymph circulation, the rôle of the spleen, jaundice, septicæmia, toxins and antitoxins were discussed in the light of their importance to the surgeon.

DR. YATES.—PRESIDENTIAL ADDRESS

The balance among and between the cellular and non-cellular constituents of blood and lymph is incompatible with disease; imbalance is incompatible with health (Bernard). The recognition of unwholesome alterations approaching anomalies and of incipient anomalies in blood formation and distribution is a command for the prompt employment of preventive and corrective measures indicated by the nature and extent of alterations. The efficacy of measures and the adroitness of employment can be measured by continuation of balance or by reduction in imbalance. Consequently, morbid physiology, estimated by the formation and delivery of blood, is more serviceable than morbid anatomy in clinical interpretation of diseases other than congenital and acquired malformation, and in the selection and application of appropriate non-operative and operative prophylactic and corrective measures.

The Treatment of Anæmia in Surgical Conditions with Special Reference to Deficiency States.—W. B. CASTLE, Boston.

In certain surgical conditions anæmia as well as deficiency states may be important complications of the clinical condition of the patient. Practical measures for the prevention and treatment of such conditions were described.

Regeneration of Hæmoglobin and Plasma Proteins.—G. H. WHIPPLE, Rochester, N.Y.

The regeneration of hæmoglobin is influenced by food, drugs, infection and liver injury. Plasma protein is the source of supply of the body protein and, like hæmoglobin, is a labile protein constantly repleted as utilized in body economy.

Variation in the Number of Leukocytes in Normal and Morbid States.—J. S. LAWRENCE, Rochester, N.Y.

Variations in the total number of the white blood cells of normal adults with reference to technique, posture, food, emotional disturbances, pain and tachycardia were discussed. Consideration of the leukocytoses secondary to infection and of qualitative changes in the white blood cells was also given.

The Regulation of Blood Sugar.—C. H. BEST, Toronto.

The level of blood sugar is the resultant of the action of two sets of influences: (1) absorption, new formation and discharge of stored carbohydrate, which tend to raise level, and (2) storage, utilization and excretion of carbohydrate, which tend to lower level of blood sugar.

The Relation of the Lymph Circulation to Streptococci Infection.—C. K. DRINKER, Boston.

Dr. Drinker discussed the formation and distribution of the lymph. Experimentally, complete obstruction of the lymph drainage in dogs produces œdema. The fluid has a high protein content. Elephantiastic growth soon supervenes and some months later the dogs have attacks of chills and fever, at which times a hæmolytic streptococcus can be isolated from the œdema fluid.

Thyroxine and the Hormone elaborated by the Adrenal Cortex.—E. C. KENDALL, Rochester, Minn.

There are indications that cortin, the hormone of the suprarenal glands, contains at least two separate substances, neither of which can produce its maximum effect in the absence of the other. Dr. Kendall announced that he and his associates have recently made a preparation of cortin differng from any hitherto described by other workers. When this preparation was given to persons with Addison's disease it was found that they were restored to normal if a small amount of salt was added to the diet. Experimental animals were kept in a normal condition, except that after a few days the amount of urea in the blood was surprisingly high and they failed slowly. Administration of salt promptly restored the blood to its normal state. In both human beings and animals it was clearly demonstrated that salt alone was not the equivalent of salt plus cortin.

On the other hand, there are other preparations of cortin that do maintain the blood in a normal state, but do not improve the characteristic weakness. Although it is impossible at present to relate physiological action to the two types of solutions, the recognition of the two actions explains many of the discrepancies that appear to exist among results obtained by various investigators.

Proceeding to a discussion of the function of cortin in the body, Dr. Kendall described experiments in his laboratory in which dogs have been kept alive by a special diet without the use of cortin although their suprarenal glands have been removed. One had lived 84 days and another 100 days. On a diet that contains a certain amount of salt, some potassium, and certain acids, the dogs are as active as any normal animals and their blood is normal. No explanation for this phenomenon has yet been advanced, but it indicates at least that cortin is not necessary for the assimilation of carbohydrates, fats or proteins. It seems more likely that it is concerned with the body's use of minerals.

The possibility that cortin may be useful in the treatment of hyperthyroidism was also suggested by Dr. Kendall. A close relationship has been discovered between cortin and thyroxin, the active principle of the thyroid gland, which Dr. Kendall was the first to isolate several years ago. Animals that are being kept in a normal condition with small amounts of cortin will develop an acute deficiency if they receive thyroxin, while animals that are receiving adequate amounts of cortin will withstand injection of thyroxin without harm. This relationship has not yet been tested on human patients.

Antigens and Antibodies.—R. L. KAHN, Ann Arbor.

New studies that should lead to better understanding of the processes of infection and more successful methods of coping with them were described by Prof. Reuben L. Kahn, Director of the Department of Clinical Laboratories, University of Michigan, Ann Arbor.

All the tissues of the body, both "fluid" and "fixed", play specific parts in defending it against infection, Dr. Kahn's experiments have shown. One of the most common manifestations of this defensive function is the familiar local inflammation, such as that seen in boils. Dr. Kahn believes that the tissues of immune animals have the capacity to detect a harmful substance and to enter into some kind of union with it. He thinks, therefore, that when a staphylococcus, the germ that causes boils, bores its way into the skin, all the cells in the area go into action. After the physical or chemical union has taken place with the "fixed" tissues, by which is meant the skin, muscles and other relatively stationary parts of the animal, fluids begin their work. These fluids bring antibodies to the spot and phagocytes, the destroyer cells, add to the process of walling off the infection from the rest of the body.

Only an immune animal has this power of localizing inflammation. When germs are introduced into the tissues of a non-immunized animal they enter the blood stream and the whole system receives the shock. Using the staphylococcus as an example, he explained that man has a high natural immunity to this organism, probably developed through ages of exposure to it. Ordinarily, the skin can handle this germ alone, allowing it to develop only a boil, at worst. But if it breaks through the local defense barriers into the blood stream, multiple abscesses and infection of bone, with danger to life, may result.

In this connection, Dr. Kahn showed how a practical result of his studies might bring about a change in the manner of giving vaccines against the staphylococcus. Since the skin has stronger immunity for this germ than other tissues, it would seem more promising to inject vaccines into the muscles, for example, than into the skin where it might be localized. Since there is no well-defined wall separating an infected area from the rest of the body some of the foreign substance may escape and serve to increase the degree of immunity. The indications are that after an animal has reached a certain degree of immunity the injection of very small doses of antigens will keep it immune. Thus it may be that the traces of antigenic material that escape from an infected part may help to prevent the spread of germs and the establishment of other foci of infection so long as resistance is good.

On the afternoon of June 13th this Section conducted a Symposium on Anomalies of Blood Formation, particularly in relation to the rôle of the spleen, and their interest to the surgeon.

DR. E. S. MILLS, of Montreal, opened with a paper entitled "Blood Dyscrasias amenable to Treatment by Splenectomy". This will appear in full in the November issue of the *Journal*.

The next paper was by DR. C. A. DOAN, Columbus, Ohio, and was entitled "Hæmolytopoietic Equilibrium and Emergency Splenectomy." In summary, Dr. Doan said.

The rôle of the spleen in hæmolytopoietic equilibrium is reflected through selective effect on formed elements of blood. Splenectomy is recognized as effective in congenital hæmolytic jaundice and at times in thrombopenic purpura; has been thought contraindicated in acute hæmoclastic crises. Immediate responses seen in platelets, leukocytes and erythrocytes after the removal of morbid spleen in chronic diseases indicate splenectomy as a safe and logical procedure in acute splenic crises, even in severe anæmia. Emergency splenectomy during erythroclastic and thromboclastic crises has arrested progress and introduced recovery in critically ill patients. Because of splenic inhibition of hæmatopoiesis, splenectomy in hypoplastic anæmia has initiated remissions, one of which has lasted for two years.

DR. A. T. Bazin, Montreal, dealt with "Surgical Procedure and After-Care". This paper will appear in the November issue of the *Journal*.

DR. W. E. Gallie, Toronto, dealt with "End-results".

He referred to statistics which if not properly substantiated and analyzed may inculcate false ideas that it may take years to eradicate. As a case in point he referred to Banti's disease, in connection with which the statements in the text-books give the impression that splenectomy is the recognized form of treatment and that the results are satisfactory. Those in charge of clinics where many such patients are under observation are aware that the truth is far from this belief. His personal experience covered 8 cases of Banti's disease treated by splenectomy. They were typical cases, attended by all the difficulties caused by adhesions, described by Dr. Bazin. Two died almost immediately of a combination of shock and hæmorrhage and it was impressed on him that this may be one of the most difficult operations in surgery. The other six did well post-operatively and then went on to what appeared to be satisfactory recoveries. At the time of operation all showed definite cirrhosis of the liver, but only two had gross ascites. In these two the ascites did not return, due perhaps to the great reduction of the portal circulation or to new adhesions which increased the anastomosis of the portal and general circulation. All made undoubted improvement in general health and even the mild blood changes characteristic of Banti's disease disappeared. At this point Dr. Gallie read his first paper, which announced that splenectomy was the cure for Banti's disease, adding fuel to the fire. Yet of these six patients who survived the operation, five are dead, of gastric hæmorrhage. It is difficult to be sure whether the operation lessened the tendency to these hæmorrhages or not, but it is his impression that it did reduce their frequency. In each case, however, a hæmorrhage occurred once a year or so, until finally one occurred which no transfusion could control and the patient died. The autopsies showed large holes in enormously dilated veins at the lower end of the œsophagus.

This gloomy recitation should not be interpreted as an attack on splenectomy as a treatment for Banti's disease, for Dr. Gallie was convinced that the very great improvement in the health of these patients which followed the operation, temporarily at least, quite justified it. Yet all would agree that when so serious an operation as splenectomy is undertaken, the physician and the surgeon, and, indeed, the patient or his friends, should have a clear idea of the results that can be expected.

Anomalies in the Distribution of the Blood were also discussed.

Total Thyroidectomy for Intractable Heart Disease.—D. D. BERLIN, Boston.

The rationale of the procedure was discussed. Actual measurements of cardiac output before and after operation show that induced hypothyroxinæmia reduces myocardial labour. Operative errors discovered and the results obtained from two and one-half years' experience were disclosed.

The Operative Treatment of Hypertension.—DR. M. M. PEET, Ann Arbor, Mich.

More than sixty patients had been subjected to bilateral resection of the greater and lesser splanchnic nerves and low thoracic sympathetic ganglions through a supradiaphragmatic approach. Patients, 19 to 57, had from 200 to 300 systolic pressure, some with ocular abnormalities (papillœdema, exudates, hæmorrhages), some with renal deficiencies (water concentration and urea clearance). There were two deaths following operation; one-tenth were unimproved; improvement in the others extended from symptomatic relief to disappearance of all signs and symptoms for intervals of from six to eighteen months.

The Non-Operative Treatment of Inadequate Peripheral Distribution of Blood.—DR. L. G. HERRMANN, Cincinnati.

Inadequate peripheral distribution of blood due to obliterative arterial diseases in the extremities can be overcome by rhythmical alteration of environmental pressure (passive vascular exercises). Dr. Herrmann discussed a mechanism to effect passive vascular exercises and the resultant establishment of an adequate collateral circulation.

Experimental Peripheral Gangrene.—DR. E. J. MCGRATH, Cincinnati.

Albino rats were given toxic doses of ergotamine tartrate to cause alterations analogous to thromboangiitis obliterans. Gangrene of the tail was produced in all animals and the microscopic changes were studied. Female rats, given appropriate doses of theelin daily, following administration of ergotamine, failed to develop even minute lesions.

On June 14th, Toxæmia, Septicæmia, Chronic Appendicitis, Cholelithiasis, and the Surgical Treatment of Jaundice were dealt with.

Staphylococcus Antitoxin and Toxoid.—C. E. DOLMAN, Toronto.

Nature of antitoxin and toxoid. Evidence existed suggesting that antitoxin and toxoid should be useful specific agents in treatment of staphylococcic infections. A review of supporting evidence of clinical results was given, which indicates the need to observe basic principles in order to confer benefits through these agents and to explain their inefficacy under certain circumstances.

The Clinical Use of Staphylococcus Antitoxin and Toxoid.—W. S. KEITH, Toronto.

Staphylococcus antitoxin was used in the treatment of toxæmia associated with septicæmia in 25 children suffering from fulminating osteomyelitis. The administration of horse serum to patients desperately ill presents serious problems. The encouraging results from the use of this antitoxin warrant additional efforts to augment efficacy and reduce the danger of its administration. Staphylococcus toxoid has been used in treating a group of patients having chronic osteomyelitis, some of long standing with multiple sinuses. Most of them had had numerous operations. There was some improvement in every patient, which could be attributed at least in part to administration of the toxoid.

The Principles of the Treatment of Septicæmia.—W. J. M. SCOTT, Rochester, N.Y.

Analysis of experience in the treatment of septicæmia emphasized the importance of eradicating or of segregating from circulation foci reinfecting blood, and the usual futility and occasional harmfulness of such drugs as gentian violet and mercurochrome given intravenously. Instead, a passive immunization has been employed in combating established septicæmia. Large transfusions of whole blood are given from donors rapidly immunized to pyogenic organisms isolated from the patient's blood. The benefits are sometimes spectacular after repeated simple transfusions, used as supportive measures, had been inefficacious. This method is not available for rapidly progressive septicæmia causing death within a week, nor is it used when eradication or segregation of reinfecting foci is sufficient. Experience has proved that it is the most beneficial measure in other forms of pyogenic septicæmia and it has replaced intravenous chemotherapy.

Neuro-Appendicopathy.—Dr. L. C. SIMARD, Montreal. This paper will appear in full in the November issue.

The Significance of Pain and Vomiting in Cholelithiasis.—DR. R. M. ZOLLINGER, Boston.

The results of distension of the gall-bladder and the common duct in conscious patients were presented. Pain may be occasioned by either. Vomiting follows distension of the common duct but not of the gall-bladder. Experimental observations appeared to coincide with clinical manifestations. Involuntary vomiting is added to the list of indications for exploration of the common duct.

Transfusions of Blood and the Intravenous Administration of Dextrose in Jaundiced Patients.—DR. E. S. JUDD, Rochester, Minn.

Preoperative transfusion of jaundiced patients has proved the most effective method of controlling the tendency to bleed after surgical intervention. The mechanism by which transfused blood effects the change is considered. Dextrose given intravenously for a period before operation has also been helpful.

Infections by Anaerobic Gas-forming Bacilli.—DR. J. R. REEVES, Indianapolis.

Dr. Reeves analyzed the cases of gas-gangrene reported in the literature. He gave four examples of gas infection illustrating the different clinical pictures. He described the different diagnostic tests. About one-third of the infections reported as due to *Clostridium welchii* are incorrectly so attributed, and those arising in old persons may be due to microorganisms already present in the tissues.

Constitution and By-Laws

The attention of members is directed to the new Constitution and By-Laws of the Association which were adopted by the Council at the Annual Meeting last June at Atlantic City. These appeared for the first time in the Supplement to the September issue of the *Journal* and are reprinted herewith. This is in conformity with the regulations in force, which provided that amendments to the Constitution and By-Laws must be published in two issues of the *Journal*. Now that this provision has been complied with, the new Constitution and By-Laws are legally effective.

CONSTITUTION

ARTICLE I.—TITLE

This Association shall be known as The Canadian Medical Association, and, when the French language is used, it shall be known as "L'Association Médicale Canadienne".

ARTICLE II.—OBJECTS

1. The promotion of health and the prevention of disease.

2. The improvement of medical services however rendered.

3. The maintenance of the integrity and honour of the medical profession.

4. The performance of such other lawful things as are incidental or conducive to the welfare of the public and of the medical and allied professions.

ARTICLE III.—ETHICS

The Code of Ethics of The Association shall be such as may be adopted by The Association from time to time. A copy shall be supplied to all members of The Association.

ARTICLE IV.—MEMBERSHIP

The Association shall be composed of ordinary members, members-at-large, senior, non-resident and honorary members, elected by the method set forth in the By-Laws.

ARTICLE V.—BRANCH ASSOCIATIONS

Each provincial medical association is recognized as a Branch Association and shall be represented on the General Council and on the Executive Committee of The Canadian Medical Association.

Any Branch, if it so desires, may merge its identity in that of The Canadian Medical Association and become a Division. It shall then be known as The Canadian Medical Association, ... (name of Province) Division. All of its members shall be members of The Canadian Medical Association and shall be entitled to all the rights and privileges of membership.

ARTICLE VI.—AFFILIATED SOCIETIES

Any nationally or internationally organized medical, scientific or sociological body may, subject to the approval of the General Council, become affiliated with The Canadian Medical Association. Affiliation shall be understood to imply the establishment of a friendly relationship with the affiliated organization. There shall be no obligation on the part of either party to the affiliation to sponsor policies or movements on the part of the other.

ARTICLE VII.—MEETINGS

The meetings of The Association shall be held in whole or in part on such occasions as may be provided for in the By-Laws.

ARTICLE VIII.—OFFICERS

(*a*) The Patron.

(*b*) The elective officers of The Association shall be a President, a President-Elect, a Chairman of the General Council, and an Honorary-Treasurer.

(*c*) The appointive officers of The Association shall be a General Secretary and such other officers as may be appointed by the Executive Committee.

ARTICLE IX.—THE GENERAL COUNCIL

The General Council shall consist of:—

(*a*) The officers of The Association.

(*b*) The President and Secretary or Joint Secretaries of the Provincial Branches.

(*c*) Delegates elected by the Provincial Branches.

Each Branch Association shall be entitled to elect five delegates to serve on the General Council for its membership in The Canadian Medical Association of fifty or less; one additional delegate for its membership from

fifty-one to one hundred; another delegate for its membership from 101 to 300; and, thereafter, one delegate for every 300 members above 300.

(*d*) Chairmen and Secretaries of Committees of The Association.
(*e*) Chairmen and Secretaries of Sections of The Association.
(*f*) Past-Presidents of The Association.
(*g*) Two representatives of the Department of Pensions and National Health.

ARTICLE X.—COMMITTEES

The Committees shall be (*a*) Standing; (*b*) Special.

(*a*) The Executive Committee shall be elected by the General Council; the other standing committees shall be appointed by the Executive Committee.

The standing committees are as follows:—

1. The Executive Committee
2. The Committee on Legislation
3. The Committee on Medical Education
4. The Post-Graduate Committee
5. The Committee on Program
6. The Committee on Constitution and By-Laws
7. The Committee on Archives
8. The Committee on Public Health
9. The Committee on Ethics and Credentials
10. The Committee on Economics
11. The Committee on Pharmacy
12. The Committee on Hospital Service
13. The Cancer Committee.

(*b*) Special Committees may be appointed by—
(i) the President
(ii) the General Council
(iii) the Executive Committee
(iv) the Chairman of the General Council.

ARTICLE XI.—FUNDS

Funds for the purpose of The Association shall be raised in such manner as may be determined by the General Council.

ARTICLE XII.—THE ASSOCIATION YEAR

The Association year shall be the calendar year.

ARTICLE XIII.—AMENDMENTS

1. Notice of Motion by individual members or others to amend the Constitution must be placed in the hands of the General Secretary six months before the date of the annual meeting.

2. Amendments may be proposed by the General Council, the Executive Committee or the Committee on Constitution and By-Laws, without notice of motion, but the proposed amendments shall be published in the *Journal* in two issues preceding the annual meeting.

3. The Constitution shall be amended by a two-thirds vote of the members of the General Council in session present and voting.

BY-LAWS

CHAPTER I.—MEMBERSHIP

Section 1—Ordinary Members

Any member in good standing in a Branch Association shall be automatically an *ordinary member* of The Canadian Medical Association provided that he (she) pays the annual fee as levied by the General Council.

Section 2—Members-at-Large

Any graduate in medicine residing in any province of Canada, who is not a member of a Branch Association shall be accepted as a member of The Canadian Medical Association on written approval presented to the General Secretary from the Executive body of the Branch Association in the province in which he (she) resides. He (she) shall be liable for the annual fee. Such members shall be designated *Members-at-Large.*

Section 3—Senior Members

Any member of The Association in good standing who has attained the age of seventy years is eligible to be nominated for senior membership by any ordinary member of The Association, but may be elected only by the unanimous approval of the members of the General Council in session present and voting. Not more than ten such senior members may be elected in any one year. Senior members shall enjoy all the rights and privileges of The Association, but shall not be required to pay any annual fee.

Section 4—Non-Resident Members

Non-resident members may be elected by the Executive Committee from regularly qualified practitioners residing outside of Canada. They shall be required to pay not more than seventy-five per cent of the annual fee.

Section 5—Honorary Members

Honorary members may be nominated by any member of The Association and shall be elected only by unanimous vote of the General Council in session present and voting. Not more than five honorary members may be elected in any one year and at no time shall the list of living honorary members exceed twenty-five. Honorary members shall enjoy all the rights and privileges of The Association, but shall not be required to pay an annual fee.

Section 6—Discipline of Members

Any member failing to conform to the Constitution and By-Laws and Code of Ethics shall be liable to censure, suspension or expulsion.

(*a*) Any member whose annual fee has not been paid on or before the 31st day of March of the current year, may, without prejudice to his liability to The Association, be suspended from all privileges of membership.

(*b*) Any member who has been found guilty of unprofessional conduct may, upon representation of the facts to the General Council, be censured, suspended or expelled from The Canadian Medical Association.

Section 7—Restoration to Membership

A member, suspended or expelled, shall not be restored to membership until all arrears of fees have been paid or such requirements, as may be determined by the General Council or the Executive Committee, have been met.

Section 8—Resignation from Membership

Membership in The Association shall automatically cease only on suspension, expulsion, or death. Resignation may be effected by giving notice in writing to the General Secretary one month before the next annual fee is due.

Section 9—Registration at Meetings

No Member shall take part in the proceedings of The Association or in the proceedings of any of the sections thereof until he (she) has properly registered and paid his (her) annual fee.

CHAPTER II.—GUESTS AND VISITORS

Section 1—Visitors from outside of Canada

Medical practitioners and other men of science residing outside of Canada may attend the annual meeting as guests of the President or of the General Council, or as visitors when vouched for by the General Secretary. They shall register with the General Secretary without payment of fee and may, after proper introduction, be allowed to participate in discussions.

Section 2—Medical Students attending Meetings

Any hospital intern or medical student, when properly vouched for, may be admitted as a visitor to the scientific meetings but he shall not be allowed to take part in any of the proceedings unless he has been specially invited by the Committee on Program to present a communication.

Section 3—Delegates from Affiliated Societies at Scientific Meetings

Two delegates from each affiliated society, one of whom shall be a member of this Association, may attend the scientific meetings.

Section 4—Delegates from Affiliated Societies at Meetings of General Council

Two delegates from each affiliated society, provided one delegate is a member of this Association, may be invited by the Executive Committee to attend meetings of the General Council. They may, at the request of the Chairman, take part in the deliberations but shall have no voting power.

CHAPTER III.—ANNUAL MEETINGS

Section 1—Time and Place of Meetings

The time and place of meetings shall be decided by the General Council, and shall be announced as early as possible.

Section 2—Arrangements for Annual Meetings

When The Canadian Medical Association meets in any province where there is a Branch Association, the meeting shall be held in conjunction with that of the Branch Association. The local arrangements shall be under the direction of the Executive Committee of The Canadian Medical Association, which may enlist the assistance of the Branch Association. The Canadian Medical Association assumes full control of the proceedings of the meeting and of all financial obligations save entertainment.

Section 3—Type of Program

The program of the meeting may consist of business sessions, general and sectional scientific sessions.

Section 4—Presiding Officer

The President or some person designated by him shall preside at all general meetings.

Section 5—Rules of Order

The Rules of Order which govern the proceedings of the House of Commons of Canada shall be the guide for conducting all meetings of The Association.

CHAPTER IV.—MEETINGS OF SECTIONS

Section 1—Sectional Scientific Sessions

The Executive Committee shall determine what scientific sections shall hold sessions at any annual meeting.

Section 2—Appointment of Sectional Officers

The Chairman and Secretary for each scientific section shall be appointed by the Executive Committee.

Section 3—Presiding Officers at Meetings of Sections

The Chairman of the Section, or some one designated by him, shall preside at all meetings of the Section.

Section 4—Duties of Secretaries of Sections

The Secretary of the Section shall keep a correct record of the transactions and shall transmit it to the General Secretary for insertion in a minute book provided for the purpose.

CHAPTER V.—OFFICERS AND EXECUTIVE COMMITTEE

Section 1—Appointment of Nominating Committee

The General Council, at the first session of the annual meeting, shall elect by ballot from among its members present a Nominating Committee of fifteen members, not including the President, who shall be *ex-officio* Chairman of the Committee.

Candidates for election to the Nominating Committee shall be named from the floor, and the list shall include the names of one or more members of each Branch Association if represented at this session.

The candidate in each province holding the highest vote of the candidates from that province shall be declared elected. The remaining members shall be declared elected by majority vote.

The election shall be decided on a single ballot. The Chairman of the General Council shall, if necessary, give the casting vote or votes.

Section 2—Duties of Nominating Committee

The Nominating Committee shall meet on the day of its election and submit to a later session of the General Council:—

1. Nominations of the following officers of The Association: a President-Elect, a Chairman of the General Council and an Honorary-Treasurer.

2. Nomination of an Executive Committee which, in addition to those who are members *ex-officio* (See Chapter VII., Section 4), shall consist of thirteen members geographically distributed as follows:—Three shall be resident in each of the two provinces in which the offices of The Association are located and one in each of the other provinces.

3. *Rules of Procedure.*—The Committee shall be called to order by the President as Chairman *ex-officio* of the Committee. In the absence of the President, the General Secretary shall convene the Committee and request the Committee to select, by open vote, the Chairman. The Committee shall then proceed to carry out its duties by open vote. In case of a tie vote, the Chairman shall have the casting vote in addition to the vote to which he is entitled as a member of the Committee. When called for, the report of the Committee shall be presented to the General Council by the General Secretary.

Section 3—Election of Officers and Executive Committee and Place of Meeting.

When the report of the Nominating Committee has been received by the General Council in session, other nominations may also be received from the floor. A ballot shall then be taken for each of the offices in turn and also for elective members of the Executive Committee by provinces in accordance with the By-Law for the guidance of the Nominating Committee, Chapter V., Section 2, paragraph 2.

CHAPTER VI.—DUTIES OF OFFICERS

Section 1—Duties of the President

The President shall preside at the general sessions of The Association and shall perform such duties as custom and parliamentary usage require. He shall deliver a presidential address. He shall be a member *ex-officio* of all committees of The Association. He shall be reimbursed for his legitimate travelling expenses while engaged in the business of The Association.

Section 2—Duties of the President-Elect

The President-Elect shall be installed and shall assume the office of President at the first general session of the annual meeting next following his election to the office of President-Elect. He shall be a member *ex-officio* of all committees of The Association. He shall be reimbursed for his legitimate travelling expenses while engaged in the business of The Association.

Section 3—Duties of the Chairman of the General Council

The Chairman of the General Council shall preside at all meetings of the General Council. He shall be a member *ex-officio* of all Committees and Chairman of the Executive Committee. He shall be reimbursed for his legitimate travelling expenses while engaged in the business of The Association.

Section 4—Duties of the Honorary-Treasurer

The Honorary-Treasurer shall be the custodian of all moneys, securities and deeds which are the property of The Association.

He shall pay by cheque only. Such cheques shall be countersigned by the Chairman of the General Council or other authorized officer of The Association and shall be covered by voucher.

He shall prepare an annual financial statement audited by a chartered accountant.

He shall furnish a suitable bond for the faithful discharge of his duties. The cost of the bond shall be borne by The Association.

He may receive for his services an honorarium to be determined by the General Council. He shall be reimbursed for his legitimate travelling expenses while engaged in the business of The Association.

He shall be a member *ex-officio* of the Executive Committee.

Section 5—Duties of the General Secretary

The General Secretary shall be the Secretary also of the General Council and of the Executive Committee of The Association. He shall also be a member *ex-officio* of all Committees of The Association. He shall give due notice of the time and place of all annual and special general meetings, by publishing the same in the official *Journal* of The Association, or, if necessary, by notice to each member. He shall keep the minutes of each meeting of the General Council and the Executive Committee in separate books and shall provide minute books for the secretaries of the different sections which he shall require to be properly attested by the secretaries thereof. He shall notify the officers and members of committees of their appointment and of their duties in connection therewith. He shall publish the official program of each annual meeting. He shall perform such other duties as may be required of him by the President, the General Council or the Executive Committee. All his legitimate travelling expenses shall be paid for him out of the funds of The Association and he shall receive for his services a salary to be determined by the Executive Committee.

CHAPTER VII.—THE GENERAL COUNCIL

Section 1—Meetings of the General Council

The General Council shall meet for at least the first two days of the annual meeting of The Association and thereafter, while The Association is in session, at the call of the Chairman. Before the close of the annual meeting, it shall elect the officers and the Executive Committee and select the place for the next annual meeting, or, if advisable, for meetings up to three years in advance.

Section 2—Special Meetings of General Council

During the interval between annual meetings, the General Council shall meet at the call of the Executive Committee. For all such meetings of the General Council, due notice shall be sent to each member, stating the purpose of the meeting. The Executive Committee, if it so decides, instead of calling such meetings of the General Council, may refer important questions to the General Council and obtain its decision by means of a mail ballot. In the event of a mail ballot being taken, two-thirds majority vote shall govern.

Section 3—Duties of the General Council

The General Council shall have supervision of all properties and of all financial affairs of The Association. It shall, through its officers, conduct all business and correspondence, and shall keep a record of all meetings and the receipt and expenditure of all funds, and shall report upon same in the *Journal* after the annual meeting.

Section 4—The Executive Committee may Act for the General Council

In order that the business of The Association may be facilitated during the interval between annual meetings, the Executive Committee shall meet from time to time at the call of its Chairman and shall have all the rights and powers of the General Council. It shall conduct all necessary business. In case of a vacancy in any office on account of death or otherwise it shall have power to appoint successors.

The President, the President-Elect, the Chairman of the General Council, the Honorary-Treasurer, the General Secretary, the Editor and the Managing Editor shall be members *ex-officio* of the Executive Committee.

CHAPTER VIII.—COMMITTEES

Section 1—Duties and Powers of the Executive Committee

The Executive Committee shall hold one or more sessions before the close of the annual meeting at which it is elected. At this meeting it shall appoint chairmen of the standing committees for the ensuing year. Between the meetings of the General Council, the Executive Committee shall represent the General Council in all its business affairs and shall exercise all the rights and powers of the General Council. The Executive Committee shall report to the General Council at the annual meeting and at such other times as the Chairman of the General Council may request.

The Executive Committee may meet when and where it may determine. On the request in writing of any three members of the Executive Committee, the Chairman shall call a special meeting. Five members, exclusive of the Chairman, shall constitute a quorum for the transaction of business.

The Executive Committee shall be responsible for the appointment of the General Secretary, the Editor, the Managing Editor, the Associate Secretaries, and any other appointive officers, and shall fix their salaries.

The Executive Committee shall have charge of the publication of the official *Journal* of The Association and of all published proceedings, transactions, memoirs, essays, papers and programs of The Association.

The Editor and Managing Editor shall present annual reports to the General Council and interim reports at each meeting of the Executive Committee. The Editor shall be reimbursed for his legitimate travelling expenses incurred on Association business.

The Executive Committee may appoint Editorial Boards to assist the Editors.

The Executive Committee shall appoint the auditor and shall have the accounts of the Honorary-Treasurer audited annually, or more often if desirable, and shall make an annual report on the same to the General Council.

Each member of the Executive Committee shall be reimbursed for his legitimate travelling expenses incurred in attending meetings of the Executive Committee other than the first meeting or meetings of the new Executive Committee, which may be held before the close of the annual meeting.

Section 2—Committee on Legislation

All matters relating to medical legislation, Federal or Provincial, and all matters requiring legislative action (made or contemplated) arising within The Association, or any of its branches, or any of its committees, shall be referred to the Committee on Legislation for information and for any necessary action.

Section 3—Committee on Medical Education

To the Committee on Medical Education shall be referred all matters pertaining to medical colleges and medical education. It shall report upon the condition of medical education throughout Canada and upon any proposed change and may suggest methods for the improvement of medical education.

Section 4—Post-Graduate Committee

To the Post-Graduate Committee shall be delegated by the Executive Committee, the responsibility of carrying out the post-graduate plans of The Association.

Section 5—Committee on Program

This Committee, with the assistance of the Chairman and Secretary of each scientific section, shall have complete charge of the preparation of the program for the annual meeting.

Section 6—Committee on Constitution and By-Laws

To the Committee on Constitution and By-Laws shall be referred all matters relating to the subject before action thereon is taken by the General Council.

Section 7—Committee on Archives

The Committee on Archives shall be responsible for collecting as far as possible, (*a*) the obituaries of members dying since the last annual meeting; (*b*) all documents

and information relating to the various members and activities of The Canadian Medical Association which are deemed worthy of preservation. The Editor of the *Journal* shall be a member *ex-officio* of this Committee.

Section 8—Committee on Public Health

(*a*) It shall be the duty of this Committee to place itself in communication with the official and voluntary health organizations of the Dominion.

(*b*) It shall be the duty of this Committee to keep the public informed through the various means available, on matters pertaining to health.

Section 9—Committee on Ethics and Credentials

To this Committee all matters of ethics and special questions of credentials shall be referred for consideration and report to the General Council or the Executive Committee.

Section 10—Committee on Economics

It shall be the duty of the Committee on Economics (excepting where otherwise provided) to deal with (*a*) social legislation which includes medical services or benefits presumably for medical services; (*b*) remuneration and employment of physicians by lay bodies, hospital or official bodies, including Federal, Provincial and Municipal Governments.

Section 11—Committee on Pharmacy

It shall be the duty of the Committee on Pharmacy to deal with (*a*) all matters arising out of the British Pharmacopœia or any Canadian Formulary or Pharmacopœia; (*b*) all matters arising out of the drug section of the Food and Drugs Act, the Narcotic Act, or the Patent and Proprietary Medicine Act, and (*c*) any inquiries from members of The Association relating to the use or standards of drugs.

Section 12—Committee on Hospital Service

This Committee shall act in an advisory capacity to the Hospital Service Department of The Association.

Section 13—Committee on Cancer

To this Committee shall be referred all matters relating to the study and control of cancer.

Section 14—Special Committees

Each Special Committee shall assume by direction such duties as are allotted to it and shall make progress reports to the Executive Committee at each of the meetings of that body or at any other time that such reports may be required by the President, the Chairman of the General Council, or the Executive Committee.

Section 15—Reports of Committees

Reports of all Committees shall be printed and mailed to all members of the General Council at least one week before the annual meeting.

Section 16—Limitations of Committees re Finances

No Committee shall expend any moneys or incur any indebtedness or obligation on behalf of The Association without the sanction of the Executive Committee.

CHAPTER IX.—ADDRESSES AND PAPERS

Section 1—Addresses at Annual Meeting

All addresses delivered at an annual meeting shall immediately become the property of The Association, to be published or not, in whole or in part, as deemed advisable, in the *Journal* of The Association. Any other arrangements for their publication must have the consent of the author or of the reader of the same and of the Editor of the *Journal*.

Section 2—Publication of Papers Presented at Annual Meeting

All papers, essays, photographs, diagrams, etc., presented in any section, shall become the property of The Association, to be published in the *Journal* of The Association or not, as determined by the Editor, and they shall not be otherwise published except with the consent of the author and of the Editor of the *Journal*.

Section 3—Disposition of Papers Presented at Annual Meeting

Each author of a paper read before any section shall, as soon as it has been read, hand it with any accompanying diagrams, photographs, etc., to the Secretary of the Section before which it has been presented. The Secretary shall endorse thereon the fact that it has been read in that Section, and shall then transmit it to the Editor of the *Journal*.

CHAPTER X.—PROVISIONS FOR DISCIPLINE

Section 1—If any member of The Association, after due enquiry by the General Council or one of its Standing or Special Committees shall be judged by the General Council to have been guilty of disgraceful conduct in any professional respect, he (she) shall be liable to censure, or suspension, or expulsion from Membership in The Association by resolution of the Executive Committee, confirmed by a three-fourths vote at the next ensuing annual meeting of General Council.

Section 2—Should any Member of The Association be convicted of any criminal offence, or have his (her) name removed from the register of the Medical Council of Canada, or of the licensing body of any Province of Canada, because of felonious or criminal act or disgraceful conduct in any professional respect, the Executive Committee may, by resolution, confirmed at the next ensuing annual meeting of the General Council, by a three-fourths vote of those present, censure, or suspend, or expel such member from Membership in The Association.

Section 3—Any member suspended or expelled by resolution, as aforesaid, shall thereby forfeit all his (her) rights and privileges as a member of this Association.

Section 4—Any member suspended or expelled by resolution as aforesaid shall, subject to conditions imposed by the Executive Committee, be restored to Membership upon resolution of the Executive Committee, confirmed at the next ensuing annual meeting of General Council.

Section 5—By subscribing to the application for membership under the terms of the By-Laws and Code of Ethics and becoming a Member of The Association, every member attorns to these By-Laws and agrees to such right of discipline as aforesaid and thereby specifically waives any right or claim to damages in the event of his (her) being so disciplined.

CHAPTER XI.—AMENDMENTS

1. Notice of Motion, by individual members or others, to amend the By-Laws, must be placed in the hands of the General Secretary three months before the date of the annual meeting.

2. Amendments may be proposed by the General Council, the Executive Committee or the Committee on Constitution and By-Laws without notice of motion, but the proposed amendments shall be published in the *Journal* in two issues preceding the annual meeting.

3. The By-Laws shall be amended by a two-thirds vote of the members of the General Council in session present and voting.

CHENOPODIUM OIL IN ASCARIASIS.—L. Schönmehl (*Med. Welt.*, March 30, 1935, p. 453) testifies to the safety and efficacy of chenopodium oil, in suitable dosage, in treatment of roundworms. In 58 cases of ascariasis the stools became free of eggs after one treatment in 51, after a second in 7. In no case were toxic symptoms noted, or signs of nephropathy. The dose recommended consists of as many drops as the patient's years of age, and is repeated in like amount after one hour. Capsules should be prescribed. It is essential to give saline purges one hour before the first and one hour after the second dose. These aid the expulsion of the worms (whose adherence to the intestine—not their vitality—is affected by chenopodium) and prevent absorption of the drug.—Abs. in *Brit. M. J.*

Provincial Association Notes

The Prince Edward Island Medical Society

The following were elected officers of the Prince Edward Island Medical Society at their Annual Meeting. *President,* Dr. J. C. Simpson, Summerside; *Vice-president, Queens,* Dr. L. B. McKenna, Charlottetown, *Kings,* Dr. A. W. Ross, Souris, *Prince,* Dr. W. B. Howatt, Summerside; *Treasurer,* Dr. I. J. Yeo, Charlottetown; *Secretary,* Dr. J. W. McKenzie, Charlottetown; *Executive Committee,* Drs. G. L. Smith, A. A. McDonald, Mark Delaney, Preston McIntyre, and R. D. McNeill; *Auditors,* Drs. J. A. McPhee and E. S. Giddings; *Editorial Board, Canadian Medical Association Journal,* Drs. G. F. Dewar and W. J. P. MacMillan; *Canadian Medical Association Council,* Drs. J. F. McNeill, W. J. P. MacMillan and I. J. Yeo; *Public Health,* Drs. W. J. P. MacMillan, B. C. Keeping, E. T. Tanton, P. A. Creelman and J. A. MacPhee.

Hospital Service Department Notes

The Pioneer Health Centre in Peckham

A new institution worthy of note by those concerned with the construction of hospitals or similar buildings, or interested in health progress, is the Pioneer Health Centre in Peckham, England. This is really a community recreation centre combined with facilities for periodic physical examinations, and the plan is to enroll several hundred families in the neighbourhood as members at the nominal membership rate of 1s. per year. The walls of the building, which has been called a new "Crystal Palace", are almost entirely of glass. In the centre of the building is a large swimming pool, on one side of which is a well equipped gymnasium and on the other a theatre. There is a children's roofed-in playground and a small swimming pool in which to teach children. There is a large library, a room where mothers may do their sewing and other needlework, and a grill under the direction of a chef. The entire building is quite modern in style and layout, and has been so treated acoustically that sound disturbance has been reduced to a minimum.

Arrangements for consulting rooms and laboratories for the medical staff have been provided. Every member on admission is required to take a medical examination. The doctors in charge will examine but will not treat the members, referring such, if necessary, to their own doctors or to the hospitals. As stated by *The Hospital* (Lond.), "The whole aim of the undertaking is a constructive one in providing for a healthy mind in a healthy body. It has a positive ideal, and presents the converse of hospital work which is centred upon sickness and disease."

All communications intended for the Department of Hospital Service of the Canadian Medical Association should be addressed to Dr. Harvey Agnew, 184 College Street, Toronto.

University Notes

University of Toronto, Faculty of Medicine

POST-GRADUATE COURSE ON PÆDIATRICS

The Department of Pædiatrics, Faculty of Medicine, University of Toronto, and the Hospital for Sick Children, Toronto, are offering a two weeks' post-graduate course to the physicians of Canada.

The course will begin on Monday, November 4, 1935, and will end on Saturday, November 16th. It will be entirely of a practical nature to demonstrate to the general practitioner the more recent advances in the diagnosis, treatment and prevention of infants' and children's diseases. The physician's time will be occupied each day from 9 a.m. until 5 p.m. with clinics in the out-patient department and on the wards as well as clinical demonstrations in the lecture theatre.

Among the subjects discussed will be the following:—

Breast feeding.
Artificial feeding in the normal infant.
Feeding disturbances of the infant, including over-feeding, under-feeding, fat indigestion, diarrhœa, vomiting, dysentery, acute intestinal intoxication, malnutrition, hypertonia, pyloric stenosis and intussusception.
Preparation of the infant's food.
Diet in the older child.
Deficiency diseases, rickets, tetany and scurvy.
Congenital and acquired heart conditions.
Functional and organic neurological conditions, including habit formation and allied topics.
Acute and chronic chest conditions including asthma, bronchiectasis and tuberculosis.
Skin diseases of infants and children.
Venereal diseases.
The most frequently encountered eye, ear, nose, throat and surgical conditions in infants and children.
Practical endocrinology.
Immunization and treatment in infectious diseases.
Practical procedures in pædiatric diagnosis and treatment.

The course will be limited to 20. The applications will be accepted in the order of their receipt and must be in before October 19, 1935. The fee for the course is $25.00.

Address applications to the Assistant Dean and Secretary, Faculty of Medicine, University of Toronto.

Special Correspondence

The London Letter

(From our own correspondent)

Over fifty years ago Sir Thomas Barlow read his historic paper, clearly separating infantile scurvy from rickets, before the Medico-Chirurgical Society of London. This paper has been reproduced in the August issue of the *Archives of Disease in Childhood* together with a series of contributions from experts in several parts of the world, to produce a special birthday number, since Sir Thomas Barlow is still fortunately with us and will have attained his ninetieth birthday by the time these lines appear in print. It is certainly an event of which the medical world may rightly be proud and "Homage to Barlow" has been paid in a happy way in the publication mentioned. A charming photograph of Sir Thomas, included in the *Archives*, reveals a face that by no means shows his age and his zest for life is still a striking feature of his character to those that meet him. At a time when biochemical studies are making the whole subject of scurvy a fascinating picture it is particularly useful to have the background by Barlow put once again before us.

From time to time significant events pointing the way towards some form of State Medical Service have been noted in these letters. Proposals for hospital reorganization in Manchester are the latest additions to these signs and portents. A scheme has been proposed whereby the consultant medical services to the municipal hospitals will be very substantially increased. It is hoped that the visiting physicians and surgeons under this new scheme will be actually responsible for the diagnosis and treatment of all cases admitted to the municipal hospitals, very much as they now are for similar patients in the voluntary hospitals. It is not proposed to employ consultants on a whole time basis, and under the new arrangements they will continue to practise privately. The details of the proposals suggest that the positions of the consultants to the municipal hospitals will, in fact, be of the same character as in the voluntary hospitals, with the sole difference that the former will be paid for their services. Upholders of the voluntary system will find this a difficult position to face, but there is no reason to suppose that any consultant's work will be any the worse because he is paid for it! A very important provision is also made among the new proposals, namely, the setting up of a joint hospital advisory board for all the hospitals in the city, thereby carrying out a part of the original Act of Parliament in a broader spirit than has been the case elsewhere. It used to be a well-known political cliché that "what Manchester thinks today England will think tomorrow". The hospital reorganization, if adopted by the City Council, will be a most striking experiment which other great cities will watch with interest.

The season of conferences is growing to an end: the "British Association for the Advancement of Science" is yet to come, but meanwhile London has had a fair share of interesting and important meetings. With Pavlov as the "star-turn" (if such disrespect may be permitted), and a discussion on epilepsy as one of the main features, the second International Neurological Congress concluded its heavy program last month, with Dr. Gordon Holmes as president. Delegates from forty-two countries came to take part in the main discussions and also to present the 250 short papers which comprised the main business of the meeting. Pavlov's paper was read before a crowded audience, and dealt with the physiological mechanism of neurotic and psychotic symptoms on the basis of his work on conditioned reflexes. Another important gathering held recently was the triennial congress of Life Assurance Medicine and the papers there presented brought out aspects which are unusual. The value of periodical medical examinations and the propaganda work carried out by the assurance companies were stressed by various speakers. Nowadays the practice of life assurance is less of a trade than an actual social service, and the big companies are playing an increasingly important part in the health services of the nations.

Important improvements in the nursing services in the London County Council have recently been announced. These include a standard 54-hour week with generous provision for off-duty time and time for meals. More controversial are the proposals for an increased employment of women orderlies to undertake many of the duties of cleaning and polishing now allocated to probationer nurses, and to assist the senior nursing staff in certain nursing procedures requiring the services of two persons simultaneously. It is urged that this leaves a loophole for the possible delegation of nursing duties to untrained workers, and another criticism made is that cleaning of equipment in sanitary annexes is an essential part of nursing ritual, not to be lightly delegated. However, such orderlies have already been employed on a small scale for some years, and, provided the young probationer is not allowed to miss the important psychological training given by carrying out even the most apparently trivial acts of personal service for the patient, the change may well turn out to be a valuable advance.

ALAN MONCRIEFF.

121 Harley St.,
London, W.1.

The Edinburgh Letter

(From our own correspondent)

At the recent Faculty of Medicine graduation ceremonial at Edinburgh University the address to the graduands was given by Professor R. W. Johnstone, of the Chair of Midwifery. There was, he said, no profession or calling which exerted such a profound and far-reaching influence on the lives of men and women as that upon which they were entering, and this fact invested their work with a correspondingly great responsibility. Although they had successfully completed their university course their real education was still to come, and unless it continued to the last day of their professional lives they would become, sooner or later, merely medical robots, automatic machines, into whose pockets unfortunate and credulous patients put anything from a shilling to three guineas, and received in return some soulless advice and a more or less innocuous prescription. He spoke of the changes which were taking place in the practice of medicine on account of the increasing way in which the State was making itself responsible for the health of the people. He himself felt that one could not contemplate these changes without regret, but he stated that the probable benefits to the community outweighed them and that, in consequence, they need not feel unduly dismayed at the prospect.

Professor Johnstone then proceeded to speak of professional success. The most important factor in success was character and personality. This counted for more than intellectual ability and for still more than knowledge. He had no doubt that in those trying days, which were now safely behind them, their examiners had frequently said to each other at the end of an oral examination: "That is a man who will do well in practice", and it was not by any means always, or even most frequently, the honours student who extracted such an unsolicited testimonial. The elixir of success in medicine was indeed a compound of intangible things which defied complete analysis. But it must contain character, in strength sufficient to enable a man to maintain his self-possession in difficulties. It was improved and reinforced by a tincture of humour, and might even be rendered effervescent by a spice of wit. It became much more potent if it were made up with the vehicle of a personality which inspired confidence and cheerfulness. It was also essential that the vessel in which it was contained, however plain or ornamental it might be, must always be kept scrupulously clean and provided with a closely-fitting stopper for its mouth. In the latter part of his address Professor Johnstone spoke of the enjoyment of life as an art requiring thoughtful cultivation and without which the attainment of cherished professional aims might be as dust and ashes in the mouth. On the other hand, he reminded the graduands that there are in Newbolt's happy phrase "lives obscurely great", and the doctor whose aim is simply to do as much good to his patients and fellow-men as he can may thereby gain a serenity of mind which will make his life a complete and rounded success, quite independently of such matters as professional distinction and financial prosperity.

It does not frequently happen that a medical man in general practice becomes a notable figure in the political life of the country but this was the life history of Dr. Joseph Hunter, of Dumfries, who died suddenly in London recently. Dr. Hunter was a native of Dumfriesshire. At Edinburgh University he took a prominent part in the communal life of the students and was President of the Student's Representative Council. On the outbreak of the South African War he volunteered for service and was with the forces till 1901, being awarded the Queen's Medal with four clasps. After taking his D.P.H. at Cambridge he settled in practice in Dumfries and built up a very large private practice. He was also physician to the Dumfries and Galloway Royal Infirmary. Thirteen years ago Dr. Hunter suddenly came to the front of the political arena. He was proposing a vote of thanks to Mr. Lloyd George on the occasion of a great Liberal Demonstration in Dumfries, and so striking was his personality and manner of delivery that he at once caught the eye and ear of the distinguished statesman. He was then offered and accepted the post as vice-chairman of Mr. Lloyd George's Land and Nation League, and within a short time he achieved the greatest ambition of his life—the representation of his native county in the Imperial Parliament. It is probable that had it not been for a breakdown in health in 1931 he would have been offered office in the first National Administration. He acted with great acceptance as Scottish Liberal Whip. He was a man of great personal charm and had the gift of making friends irrespective of class or party.

The Managers of the Royal Infirmary of Edinburgh have appointed Lieut.-Col. A. D. Stewart, C.I.E., M.B., Ch.B., F.R.C.S.Ed., as medical superintendent in succession to the late Colonel Thom. Colonel Stewart at present holds the appointment of Director of the All-India Institute of Hygiene and Public Health in Calcutta. He joined the Indian Medical Service in 1906, and during the war he served in Gallipoli, Mesopotamia and in India.

The Select Committee of the House of Lords appointed to consider the Registration and Regulation of Osteopaths' Bill have decided that the claim of the Osteopaths to be able to treat all diseases has not been established and that the Bill be not further proceeded with. The Committee pay a tribute to the ability and sincerity of Dr. Kelman Macdonald, of Edinburgh, who gave evidence before the Committee

as to the scientific basis on which the Osteopathic theory is founded; but they point out that he is a registered medical practitioner and that while he adhered to the formulæ on which osteopathy is based, it was clear that in practice he would not deny his patients, where necessary, the benefits of appropriate medical or surgical treatment. The osteopaths, however, are not prepared to accept the situation and leave the matter alone. Steps are being taken to form a General Osteopathic Council which would undertake the establishment of a register of qualified osteopaths and the organization of a reputable college for the education and training of osteopaths.

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Topics of Current Interest

Air Raids and Poison Gas

The Home Office last week issued a circular[1] describing the precautionary measures to be taken for the protection of the public against attack by hostile aircraft. The Government feel they would be neglecting their duty to the civil population if they failed to take such precautions, since developments in the air have made it possible for attacks to be delivered—and delivered suddenly—on many parts of this country; but the circular states that "the need for these measures in no way implies a risk of war in the near future, nor does it imply any relaxation of effort on the part of His Majesty's Government to ensure the promotion and maintenance of peace by all the means in their power". The first step has been to establish an Air Raid Precautions Department at the Home Office and this will be directly responsible for central activities including the issue of warnings, the accumulation of gas respirators and protective clothing for certain air-raid services, the coordination of demands for hospital equipment, the storage of bleaching-powder for decontamination of gassed areas, and the issue of advice. The British Red Cross Society and the Order of St. John of Jerusalem are also to play their part, by the enrolment and training of emergency personnel, especially for medical and anti-gas services, and in the instruction of the public. The main responsibility, however, is to rest with the local authorities, which must arrange schemes for treatment of casualties, and the maintenance of all the essential services in their charge. These are briefly outlined in the circular, but fuller information for the authorities and the public will be given in a series of handbooks to be issued in due course. Meanwhile those interested in the subject can easily find other sources of information, both reassuring and otherwise. In the first category we have Mr. Davidson Pratt's recent lecture to the British Science Guild[2]; he thinks that the terrors of gas attacks have been much exaggerated, and believes that the civil population as a whole, if trained against panic, will find tolerable safety by staying in gas-proofed rooms in their own houses. The Union of Democratic Control, on the other hand, after reviewing[3] the incendiary and toxic agents available, quotes the conclusion of a commission of the International Red Cross (1928) that if the technique of offensive weapons continues to improve "the fatal moment must arrive in which the question of defence, already extremely difficult in view of the means already available, becomes an insoluble problem. A large proportion of the inhabitants of populated towns must be doomed to destruction". In these circumstances, it is suggested, the precautions proposed by Mr. Davidson Pratt and others cannot be taken at their face value, and the public should be fully informed of the facts, as summarized in the Union's pamphlet. By way of alternative, more technical details are obtainable, if desired, from the official "Manual of the Medical Aspects of Chemical Warfare" (1926) or, with later details, in a paper just issued by Dr. Bischoff[4], of Lugano, who describes the symptoms, signs, and treatment of various forms of gas-poisoning. Evidently the medical profession will soon be expected to enlarge its repertoire so as to be able to deal with these new man-made diseases. But like other pathological conditions they are more easily prevented (one would suppose) than cured.—*The Lancet*, 1935, **2**: 145.

1. Air Raid Precautions. London: H.M. Stationery Office. 1935. Pp. 8. 2*d*.

2. Gas Defence. By J. Davidson Pratt, O.B.E., F.I.C. British Science Guild, 6, John-street, Adelphi, W.C.2. Pp. 18. 1*s*.

3. Poison Gas. Published by Union of Democratic Control, 34, Victoria-street, S.W. Pp. 63. 6*d*.

4. BISCHOFF, L.: Massnahmen vor, während und nach Flugzeugangriffen, Basel, Benno Schwabe & Co., 1935. p. 28.

Transplantation of the Cornea

With all the brilliant achievements of the nineteenth century in ophthalmology, there was one disappointment. The eighteenth century had solved the problem of blindness from opacity of the lens by evolving the modern cataract operation; iridotomy was another step in relieving blindness due to occlusion of the pupil; but all efforts in the nineteenth century towards relieving blindness from opacities in the cornea were unsuccessful. As early as 1795 Erasmus Darwin trephined out opaque areas in the cornea, hoping to obtain clear substance on healing. Subsequently attempts were made to excise corneal scars and to suture the clear cornea. During the first third of the last century many attempts were made to transplant the cornea *in toto*. Experimental work on rabbits raised great hopes, but the operation invariably failed when performed

on man. A new approach was evolved by Nussbaum in 1856: he implanted a glass lens in the cornea, and though technically this was successful the eye was invariably lost from irritation. Yet another method of approach was the application of contact glasses, but these had no great utility where the cornea was scarred to any extent. It was only at the beginning of the present century that, with the classical case of Zirm, the first success with corneal transplantation was achieved. The work that has evolved since has been based largely upon the recognition that if a graft is to succeed it must be of human origin, small, and implanted into the cornea itself. At the Oxford Ophthalmological Congress Mr. Tudor Thomas gave an interesting review of the present state of knowledge on this subject. Elschnig of Prague has had experience of no fewer than 139 cases, and Filatov of Odessa of nearly fifty. Tudor Thomas, speaking from experience of twenty-three cases, showed that his own technique gives something like 75 per cent of successes in selected cases. Taking the results as a whole, the percentage of successes was in the neighbourhood of 50. Much apparently depends upon the state of the cornea undergoing grafting; different observers lay down somewhat conflicting criteria, so that even now the question whether opacities due to injury or to disease are the more amenable to treatment must be left open. It would appear that to ensure success some clear cornea must be present. For an operation which as yet has no standardized method and no unequivocal indications, the results reported are distinctly hopeful. There can be no doubt that a promising, even if limited, field of activity has been opened up by this work.—*Brit. M. J.*, 1935, **2**: 121.

Medico-Legal

XIII.

Owens v. Dobson, Lowrie and Owens*

British Columbia—Mental Hospitals Act (R.S.B.C., 1924, Cap. 158, Sec. 45)—Good faith, or reasonable care of physician certifying insane person as a bar to an action in damages.

The defendant, Dr. Dobson, who is a specialist in mental diseases, had been called to examine the plaintiff, and in due course certified her insane under the provisions of the Mental Hospitals Act. The plaintiff's husband, however, failed to proceed as required by the Act. Instead, some time later, he had his wife arrested on a warrant and incarcerated upon an information before a magistrate. Again Dr. Dobson was called upon to examine her, and as a result of his second examination, gave evidence at the hearing that he was not then prepared to say that the plaintiff was dangerous. She was thereupon released and subsequently took the present action in damages for malicious prosecution and conspiracy. The matter came before the court in the form of an application for an order that proceedings against the defendant Dr. Dobson be stayed.

Section 45 of the Mental Hospitals Act reads as follows:

> "Judges, Registrars, District or Deputy Registrars, or Stipendiary Magistrates, or Police Magistrates, or Justices of the Peace, who sign the order, or any persons who sign the statement, or duly qualified medical practitioners who sign the medical certificates under any section of this Act, shall not be liable to any civil proceedings on the ground of want of jurisdiction, or on any other ground, if they have acted in good faith and with reasonable care; and if any such proceedings are commenced, they may be stayed upon summary application to the Supreme Court or to a Judge thereof upon such terms as to costs and otherwise as the Court or Judge may think fit, if the Court or Judge is satisfied that no reasonable ground exists for alleging want of good faith or reasonable care; and no action shall be brought against such Judge, Registrar, District Registrar, Deputy Registrar, Stipendiary or Police Magistrate, Justice of the Peace, or duly qualified medical practitioner, except within twelve months next after the release of the party bringing the action, and any such action shall be laid or brought in the county where the cause of action arose, and not elsewhere."

There is a material similarity between this section and the corresponding section of the English Lunacy Act, and counsel for Dr. Dobson quoted jurisprudence on the English Act in support of his contention that proceedings against his client should be stayed. An action should not be maintained against a medical man on the mere assertion that he had come to the wrong opinion in giving a lunacy certificate. It must be shown that the medical man had not acted in good faith or with reasonable care. Furthermore, if a civil action is commenced, proceedings may be stayed upon summary application if the court or judge is satisfied that no reasonable ground existed for alleging want of good faith or reasonable care. The judge ordered the action stayed as against Dr. Dobson. (G.V.V.N.)

* (1935), 49 B.C.R. 283, Morrison, C.J. S.C. (In Chambers).

XIV.

Vancouver General Hospital v. Annabelle McDaniel*

British Columbia—Sterilization as opposed to isolation in the treatment of smallpox—Negligence—Onus of proof—General and approved practice.

The facts of this case were these. On January 17, 1932, the respondent, Miss Annabelle McDaniel, had been admitted to the Appellant's Infectious Diseases Hospital in Vancouver,

* Privy Council Appeal No. 19 of 1934. An appeal from the Court of Appeal of British Columbia as yet unreported.

suffering from diphtheria. Smallpox was then prevalent in Vancouver, and on and after January 18, smallpox patients were admitted to the hospital and were placed in rooms on the same floor as the respondent's room and adjacent to it. Four sufferers from smallpox having been admitted in this way on January 29, respondent, upon the request of her mother, was moved to another floor of the hospital where there were no smallpox patients. On February 3, the respondent was discharged from the hospital, cured of diphtheria, but on the 12th was found to be suffering from smallpox.

The respondent and her next friend, her father, instituted the present action in damages on the ground that she had contracted smallpox with its consequent disfigurement while in the appellants' hospital and due to their negligence. More specifically, it was alleged that the negligence of the appellants, the defendants in the trial court, was based upon, first, the juxtaposition of the respondent and smallpox patients on the same floor of the hospital, and, secondly, the attendance upon the respondent by nurses who also nursed the smallpox patients. The complaint, in other words, was not that the technique adopted had been faultily carried out by those for whom the hospital was responsible, but that the wrong technique itself had been adopted. The action was based on direct and not vicarious responsibility.

The burden of proving the negligence alleged rested, of course, upon the plaintiff, now the respondent. The only question arising for decision was whether she had discharged that burden. But though the appeal was on a question of fact only, the respondent succeeding or failing, depending upon the court's appreciation of the evidence, still the judgment is interesting as being one of the few appeals upon medical matters which have reached the Privy Council from Canada, and as suggesting certain possible grounds upon which a hospital may be responsible in damages. The case is digested here for these reasons.

Lord Alness, who delivered the judgment of the Privy Council, pointed out that practically the only medical evidence adduced by the respondent was that of Dr. Kennedy, her physician, who stated, "in spite of recent teachings," his preference for the old system of isolation in a separate building of smallpox cases in preference to the new system whereby in effect sterilization is substituted for isolation.

On the other hand, the appellant Hospital had shown that in modern practice the system adopted by them was in vogue throughout Canada and the United States. Furthermore, it had been proved that when the erection of a new infectious diseases hospital in Vancouver was being discussed, a deputation had been sent to visit up-to-date hospitals in the United States and that the deputation had subsequently presented a report of its findings. The appellants' defense was, therefore, twofold: first, that the technique of which the respondent complained was adopted on competent medical advice, and, secondly, that it was in accord with approved modern practice. The appellant, said Lord Alness, had not clearly proved that it had adopted the technique complained of on medical evidence tendered to it. On the other hand, the appellants' technique on the two grounds complained of by the respondent had been approved by several medical witnesses produced by it. Not only did the witnesses personally approve of it, but they affirmed that the criticized technique was in accord with general if not universal practice in Canada and the United States. "A defendant charged with negligence," said Lord Alness, "can clear his feet if he shows that he has acted in accord with general and approved practice." The appellants, in their Lordships' opinion, even if the *onus* rested on them of doing this, had in this case done so by a weight of evidence that could not be ignored.

Judgment was therefore given for the appellant Hospital. It should be emphasized, however, that this decision can in no way be construed as an approval of the technique used by the Hospital in the treatment of smallpox. To quote the words of Lord Alness:

> "Their Lordships, however, cannot make it too clear that they are offering no opinion of their own as to the relative merits of what is termed the unit system in contra-distinction to the isolation system for the treatment of smallpox, nor are they offering any opinion of their own upon the two points in the technique of the appellants which the respondent challenges. Such problems are not submitted to them for decision. Theirs is the simpler task of deciding whether, upon the evidence submitted in this case, the respondent has succeeded in proving that the appellants were negligent. Having regard to the favourable opinion expressed by all the appellants' medical witnesses regarding the technique followed in the Vancouver Hospital, and to the accepted practice in regard to that technique appearing from the same evidence, their Lordships are constrained to hold that the charge of negligence brought by the respondent against the appellants in this case is not established. That is all the length that their Lordships are prepared to go; that is all the length it is necessary to go, in deciding this appeal."

(G.V.V.N.)

Fortune takes care that Fools should still be seen:
She places 'em aloft, o' th' topmost spoke
Of all her wheel. Fools are the daily work
Of Nature, her Vocation: If she form
A Man, she loses by 't; 'tis too expensive;
'Twould make ten Fools: A Man's a Prodigy.

—Dryden; *Œdipus.*

Abstracts from Current Literature

Medicine

Some Factors in the Control of Poliomyelitis. Fairbrother, R. W., *Brit. M. J.*, 1935, **1**: 916.

In Great Britain, while there have been no large epidemics of poliomyelitis, sporadic cases are always occurring. This suggests a wide dissemination of a virus of limited virulence, from which it follows that a majority of the adult population have acquired some immunity—a state of affairs always counteracting the appearance of an extensive epidemic. Small outbreaks are always liable to appear in schools or institutions where groups of children are congregated. In such an event the school should not be closed, as this would widely disseminate the virus; all definite or suspicious cases should be isolated. It is useless or even harmful to have contacts use ordinary gargles which have been shown to spread the virus into the nasopharynx, increasing the liability of the olfactory nerve endings to be attacked. The use of oxidizing agents, as peroxide or permanganate, however, is commended, as these agents are definitely injurious to the virus. No safe method of active immunization has yet been devised; passive immunization can be carried out with immune horse serum. The effects of an injection last only a few weeks, and may have to be repeated if the epidemic persists.

General measures of treatment of the actual case, such as rest, attention to diet, and especially spinal drainage, are all important. The value of serum therapy is difficult to assess, since in over 70 per cent of cases treated without serum, recovery occurs without paralysis. The pre-paralytic stage is obviously the optimum time for serum, as some of the nerve cells may be reached before they are attacked by the virus, and their resistance raised. Pooled convalescent or immune horse serum may be used, preferably intravenously, or else intramuscularly. A study of the pathogenesis of the disease offers no support for intrathecal administration, which may indeed give rise to harmful reactions.

The author believes that with any heavy infection there is little hope of benefit from serum, but that its early use is always justifiable in view of the crippling nature of the disease.

W. FORD CONNELL

Gallop Rhythm. Bramwell, C., *Quart. J. Med.*, 1935, **13**: 149.

Amongst 1,353 cardiac cases seen by the author in three years, he found 63 showing gallop rhythm; sixty-two of these he has been able to follow, and finds that after one and a half years only 10 were still alive. Other striking features of the series, besides the high mortality, are the rarity of inflammatory as compared with degenerative heart disease, the frequency of congestive failure, anginal pain and cardiac asthma, and the invariable presence of tachycardia. The author restricts the term "gallop rhythm" to that type of triple rhythm in which the heart is seriously embarrassed and in which the third heart sound occurs in presystole. Such types of triple rhythm as are caused by accentuation of the normal third heart sound (which is closely related to the preceding 2nd sound), and split sounds due to asynchronous closure of the aortic or pulmonic valves are rigidly excluded. In true gallop rhythm, the three sounds are almost evenly placed, and the accessory sound is nearly always as easily palpable as heard, being appreciated as a distinct dull thud. The author has never met true gallop rhythm in association with mitral stenosis. He believes that the additional impulse in gallop is produced by sudden distension of the ventricle, and the additional sound by vibration of the ventricular wall, both phenomena being due to an abnormally rapid rate of filling of the ventricle when the myocardium is lacking in tone. He does not consider that true gallop rhythm is causally related to A-V block or to bundle-branch block. The three factors essential to the production of gallop are auricular contraction, tachycardia, and a failing heart.

W. FORD CONNELL

The Heart in Thyroid Disease. I. The Effect of Thyroidectomy on the Orthodiagram. Margolies, A., Rose, E. and Wood, F. C., *J. of Clin. Investig.*, 1935, **14**: 483.

These investigators carried out orthodiagraphic studies on the hearts of 102 thyrotoxic patients and 35 with non-toxic goitre. Their observations were made before sub-total thyroidectomy was instituted and at frequent intervals afterwards—for a year in most cases. They found that there was a significant increase of the cardiac area in 26 per cent of their cases of uncomplicated hyperthyroidism, and in 14 per cent of those with uncomplicated non-toxic goitre. After operation the cardiac area in the former group, whether large or small, returned to normal, whereas those that were normal remained unchanged, while in the second group these changes did not occur. The authors also found that post-operative hypothyroidism may occasionally be a factor in increasing the cardiac area. Congestive heart failure in hyperthyroidism was almost always accompanied by an increased cardiac area which tended to return to normal with post-operative restoration of compensation, provided that the thyrotoxicosis was also relieved. They found that in 54 per cent of their cases of hyperthyroidism and in 14 per cent of those of non-toxic goitre there was an increased prominence and/or pulsation of the pulmonary artery. They could find no adequate reason for this. Cardiac pulsation, as

observed with the fluoroscope was usually characteristically altered in hyperthyroidism. However, the heart proper did not assume a characteristic shape in persons with toxic or non-toxic goitre.

JOHN NICHOLLS

The Heart in Thyroid Disease. II. The Effect of Thyroidectomy on the Electrocardiogram. Rose, E., Wood, F. C. and Margolies, A., *J. of Clin. Investig.*, 1935, **14**: 497.

On the same series of patients reported on in the last abstract electrocardiographic studies were carried out. The observations were made both before and after operation, and continued in most cases for a year. The authors found that abnormal cardiograms occurred with about the same frequency in patients with toxic and with non-toxic goitre (45 and 41 per cent, respectively). After sub-total thyroidectomy, however, abnormal electrocardiograms were obtained in 97 per cent of cases with hyperthyroidism and in only 56 per cent of cases of non-toxic goitre. Large P waves were common in hyperthyroidism, and after successful thyroidectomy they were much reduced. After sub-total thyroidectomy in cases of hyperthyroidism the electrical axis of the heart was found to shift to the left in about one-half of the cases. No adequate reason could be found for this. The authors also discovered that there were marked, but variable and unpredictable, changes in the T wave after thyroidectomy in hyperthyroidism. They think that T wave inversion in thyrotoxicosis does not necessarily indicate the presence of chronic myocardial disease. It is met with quite frequently as a transient phenomenon. Finally, they conclude that the electrocardiographic changes seen in patients with toxic and non-toxic goitre do not seem to be related to (*a*) changes in the size of the heart; (*b*) the rate of the heart; (*c*) post-operative improvement in thyrotoxicosis; (*d*) the duration or severity of the thyrotoxicosis; (*e*) age; (*f*) sex; (*g*) the state of cardiac compensation; (*h*) the presence of substernal goitre; (*i*) operative injuries to the recurrent laryngeal nerve; (*j*) the type of anæsthesia employed, or (*k*) the severity of the post-operative reaction.

JOHN NICHOLLS

Surgery

Eventration of the Diaphragm. Read, J. H. and Borden, D. L., *Arch. Surg.*, 1935, **31**: 30.

In this article a summary is given of the available knowledge of this condition, with a discussion of the literature. In addition the reports of two cases are presented. Clinically, the lesion has come to mean a congenital or, occasionally, an acquired, high or elevated position of one leaf of the diaphragm muscle, characterized pathologically by aplasia or atrophy of the muscle fibres of the affected side but with no break in the continuity of the muscle. The symptoms produced suggest a gastric, cardiac, pulmonary or pleuro-pulmonary origin. No specific cause is demonstrable for eventration of the diaphragm. Though usually believed to be of congenital origin, reports of the past ten years seem to substantiate the acquired nature of the disease. The author believes that we must accept the grouping of both congenital and acquired types.

Usually the symptoms appear insidiously and are of varying duration, but occasionally the onset is sudden. The duration of the symptoms has varied from two weeks to twenty years from the time of onset. They may be classified into four groups: (1) respiratory; (2) gastro-intestinal; (3) circulatory; and (4) general. Gastro-intestinal and respiratory symptoms seemed to dominate the picture in a majority of cases. In order of frequency the gastro-intestinal symptoms were: pain in the abdomen, vomiting, pressure or weight in the stomach, gas, constipation, nausea, belching, loss of appetite, diarrhœa, pain on swallowing, cramps, and heartburn. Respiratory symptoms were: dyspnœa, pain in the chest, cough and wheezing. Cardiac symptoms were: palpitation, cyanosis and tachycardia. General symptoms were: loss of weight, fatigue, or weakness, dizziness, sinking or fainting spells, pain down the arm on the affected side, malnutrition, œdema of the lower extremities, insomnia, exhaustion, restlessness and numbness of the extremities.

The main physical signs are limited to the affected side of the thorax and the adjacent abdominal area. Litten's sign is absent, and Korns' or Hoover's sign is present. These latter reveal diminished tactile fremitus at the base of the lung posteriorly on the involved side. The apex of the heart is difficult of palpation, and, when located, is abnormally close to the left sternal border.

There are no pathognomonic roentgenological signs, though there are a number of signs which may make one strongly suspect eventration and so lead to a tentative diagnosis. The outlook so far as life is concerned is usually good, but it is a disabling disease in many persons. No curative treatment is possible. Absence of physical exertion is essential. Surgical intervention has been done a number of times.

G. E. LEARMONTH

The Surgical Management of Brain Abscess. Adson, A. W. and Craig, W.McK., *Ann. Surg.*, 1935, **101**: 7.

Hasty emergency operations for brain abscess are futile and are accompanied by a high mortality. Every cerebral abscess passes through a stage of encephalitis before encapsulation. During this stage the infection is virulent and easily disseminated by any surgi-

cal intervention. The best procedure to employ during the acute stage is supportive treatment, rest in bed, high caloric diet, spinal drainage, ice-bags to the head, frequent catharsis, moderate amounts of fluids, and, if the patient is comatose, occasional intravenous administration of hypertonic glucose. Encapsulation takes place in two to four weeks. The temperature and leucocytosis abate, the cell count of the cerebrospinal fluid, if increased, returns to normal, and the cerebral symptoms gradually but not completely subside. When encapsulation and immunity have been established thorough and continuous drainage is necessary to effect a cure without recurrence of the abscess. If possible the cranium is entered through a clean field over the abscess. Efforts are made to seal the cortex and meninges to the margins of the skull opening to protect against the spread of pus over the cortex. The authors advise insertion of rubber drains and gauze packs into the abscess cavity. When cerebral abscesses follow infection about the ear, with indefinite localizing symptoms or with conflicting localizing signs, they advise exploring the temporo-sphenoidal lobe before exploring the cerebellum on the side of the infected ear, because of the higher ratio of abscesses in the temporo-sphenoidal lobes than in the cerebellum.

FRANK A. TURNBULL

Obstetrics and Gynæcology

The Rôle of Blood Transfusion in the Treatment of Obstetric Hæmorrhage. Dieckman, W. J. and Daily, E. F., *Am. J. Obst. & Gyn.*, 1935, **30**: 1.

Obstetric hæmorrhage is responsible for more than 10 per cent of the maternal deaths. The mortality has not decreased in the last twenty years, despite the use of blood transfusions. If the maternal deaths due to hæmorrhage from abortion, accidents of labour, and ectopic pregnancy are included, the rate is increased to 28 per cent. Hæmorrhage decreases the blood volume, and, if massive enough, initiates shock, resulting in death of the patient unless prompt treatment is instituted. Some of the important constituents lost as the result of hæmorrhage are water, hæmoglobin, serum protein and fibrinogen. These can be replaced by blood transfusion and parenteral fluid, and will function, so far as is known, as well as the patient's own blood and fluid. The blood loss during hæmorrhage is usually underestimated. It should be correlated with the patient's hæmoglobin and blood volume or weight.

The citrate method of blood transfusion is ideal in the practice of obstetrics. Group IV (Moss) donors are preferred because their cells contain no agglutinogens. The mortality rate from obstetric hæmorrhage can be lowered only if sufficient blood is transfused to raise and maintain the hæmoglobin to approximately 10 g. per 100 c.c. of blood. The transfusion must be adequate in amount and must be given within a short time after the hæmorrhage. Further transfusions may be given within a period of hours or spread over several days, depending on the amount of blood required and the clinical condition of the patient.

ROSS MITCHELL

Some Problems in Pregnancy and Diabetes. Kramer, D. W., *Am. J. Obst. & Gyn.*, 1935, **30**: 68.

Acidosis may exist in the later months of pregnancy without symptoms or signs. Coma is relatively infrequent, but may develop suddenly in the late months of pregnancy. Diabetes may influence the course of pregnancy by causing miscarriages, necessitating therapeutic abortions, or by making induction of labour advisable before term to save the mother or child. Hydramnios is frequent in diabetes, ranging from a former percentage of 27 to 11 since the use of insulin.

The maternal death rate in diabetics is comparatively high. There were 8 deaths in 238 pregnancies, equivalent to 33.6 deaths per 1,000 births. If the rate included those who died within three years after delivery the figures would be 79 deaths per 1,000 births. There were 114 live births in 238 pregnancies, 47 per cent, as compared with 96 per cent live births in Pennsylvania in non-diabetics. Still births are of frequent occurrence in diabetics; 21 per cent, compared with 4.2 per cent in Philadelphia statistics for non-diabetics.

In the case of the diabetic who desires children, the patient and family should be informed of the added risks, the likelihood of complications during pregnancy, plus the diminished chances of having a live child. If the woman is careful as to diet, and if adequate insulin is administered, she may go successfully to term. Treatment must be instituted early and maintained through the pregnancy.

The successful termination of pregnancy in a diabetic will depend upon the severity of the disease, frequent periodic investigations, faithful adherence to the diabetic regimen, and the skilful management of the case both by the obstetrician and internist.

ROSS MITCHELL

Roentgenologic Diagnosis of Placenta Prævia. Ude, W. H. and Urner, J. A., *Am. J. Obst. & Gyn.*, 1935, **29**: 667.

Digital examination of the placenta through the cervix is accurate but not without the danger of producing severe hæmorrhage and infection. X-ray examination of the lower segment of the uterus and the bladder enables a diagnosis of central or partial placenta prævia

to be made with a high degree of accuracy, without incurring the dangers inherent in digital examination. The roentgenological interpretation should be in agreement with the findings of the abdomino-rectal examination. If the interpretation is based on sufficient experience, it will invariably corroborate the clinical findings, provided that these also have been made by an experienced observer. The greatest value of this method lies in the fact that it permits an accurate diagnosis without producing contamination of the genital tract. If a Cæsarean section is to be done, this elimination of possible infection is of great importance. The x-ray method of diagnosis is of value only if the fetal head is the presenting part. The technique, which is fully described, is comparatively simple.

ROSS MITCHELL

Pædiatrics

Gastromegaly from Arterio-mesenteric Compression of the Duodenum in the New-born. Miller, R. and Gage, H. C., *Arch. of Dis. in Childhood,* 1935, **10**: 179.

Gastromegaly from mechanical obstruction to the emptying of the stomach is a well-recognized condition in the adult, though comparatively rare. The most important direct cause is compression of the duodenum at the junction of the second and third parts by the radix mesenterii, a condition of things which is favoured by sundry other factors, notably, the administration of anæsthetics, compression of the thorax by plaster casts, dietary indiscretions, emaciation, prolonged rest in bed in the recumbent position, and loss of nervous tone, leading to visceral distension or ptosis. Drs. Miller and Gage, in their paper, offer evidence to show that certain cases of obstructive vomiting in the new-born, simulating intrinsic duodenal stenosis or atresia, are examples of duodenal ileus due to arterio-mesenteric compression and are amenable to medical treatment. They urge that where in this type of case radiological or other examination shows that the duodenal obstruction is not complete duodenal ileus should be suspected and a brief trial made of gastric lavage. They report three cases to support their contention.

The chief clinical features of the syndrome consist of gastromegaly, causing distension of the upper abdomen and occasionally visible peristalsis; vomiting of the obstructive type, and projectile, the vomitus being large in amount, admixed with mucus.

Radiological examination will demonstrate the existence of obstruction in mild cases, and in the severe ones will distinguish between complete and incomplete obstruction. It will easily exclude any form of pyloric obstruction, and, especially in oblique views, may demonstrate duodenal stasis.

JOHN NICHOLLS

A Clinical Comparison of the Antirachitic Value of Irradiated Yeast and of Cod Liver Oil. Compere, E. L., Porter, T. E. and Roberts, L. J., *Am. J. Dis. of Child.,* 1935, **50**: 55.

Yeast is one of the richest known sources of ergosterol, and is easily given antirachitic potency by exposing it to ultra-violet rays. As this substance is cheap it seemed to be worth while to investigate its clinical value as compared with cod liver oil.

This paper is based upon a careful and thorough study of 21 children out of 83 referred by infant welfare stations in Chicago. These children ranged in age from 5 to 30 months, and presented rickets in varying degrees. They were studied over a period of three months. The cases were adequately controlled.

The authors conclude that irradiated dry yeast when given to children in sufficient quantities is an efficient antirachitic agent. The minimal amount of irradiated dry yeast required to effect a cure was 1.25 g. a day. This amount contains 6,755 International or U.S.P. revised units of vitamin D. On the basis of roentgenological evidence it was found necessary to give 1.1 to 3.3 times as many rat units of vitamin D in the form of irradiated yeast as in the form of cod liver oil, to bring out a comparable degree of improvement in rickets in children.

JOHN NICHOLLS

Ophthalmology

Is Primary Glaucoma an Inflammatory Affection? Redslob, E., *Ann. d'Ocul.,* 1935, **172**: 1.

During the course of chronic glaucoma, called primary, we often observe on the posterior surface of the cornea the formation of precipitates. These are very fine and are seen only with the slit-lamp. They are not, as has been suggested by different writers, the sign of an intra-ocular inflammatory process. The phenomenon is due to disturbance of the circulation, especially venous stasis which has developed in the centre of the iris. It is possible, too, that in other affections, non-glaucomatous, the presence of precipitates does not indicate inflammation, but rather a condition of stasis. It is also proved that the blood of the retinal hæmorrhages may take its source from the vessels of the choroid and not exclusively from the vessels of the retina. Finally, the canal of Schlemm may contain blood in cases of primary glaucoma, intra-ocular tumours, and very acute iridocyclitis.

S. HANFORD MCKEE

A Case of Orbital Neoplasm Difficult of Diagnosis. Morax, V. and Rousseau, F., *Ann. d'Ocul.,* 1935, **172**: 41.

A young girl of 11 years, following a slight infectious condition considered to be influenza,

started to show at the end of July, 1932, an inflammatory process in the left orbital region, with swelling of the upper lid, a lowering of the left globe and a palpable new growth. The tumour invaded progressively and slowly the whole orbit, and exophthalmos became so severe that the globe was completely immobile. Operation showed the new growth to be adherent on one side to the bony orbit, and on the other to the muscles and posterior part of the globe, which penetrated by diffuse infiltration the muscles, the superficial layers of the sclera, adipose tissue, etc. On account of its extreme rarity sections were submitted to Dr. Redslob, who replied that he had never seen anything like it and did not possess any similar specimen in his collection. Morax thought it was perhaps due to the action of a mycelium because of the particularly large number of eosinophile cells. Admitting this hypothesis, the mycelium network does not correspond either to sporotrichosis, actinomycosis, or streptotrichosis, but further than that they are not able to offer any solution.

S. HANFORD MCKEE

Choked Disc and Papillitis: Differential Diagnosis by the Protein Content of the Aqueous. Selinger, E., *Arch. Neurol. & Psych.*, 1935, **33**: 360.

Stressing the great importance of differentiating a true inflammatory papillitis from the papillœdema of increased intracranial pressure, the author presents an apparently simple method of differentiating between these two important conditions. It is far from uncommon, clinically, to encounter cases in which the ophthalmoscopic picture is not adequate basis for a sound diagnosis.

In 8 cases of papillœdema due to high intracranial pressure the protein content of the aqueous was found to be less than 0.02 per cent. In contrast, the cases of papillitis showed protein contents ranging from 0.04 to 0.1 per cent. Admitting frankly that the number of cases studied is far from adequate, the author feels that the method is worthy of further trial. Apparently puncture of the aqueous is a simple and safe procedure and may be performed freely by skilled workers.

G. N. PATERSON-SMYTH

Oto-Rhino-Laryngology

The Treatment of Acute Suppurative Otitis Media by Syringing with Alcohol. Schmidt, V., *J. Laryngol. & Otol.*, 1935, **50**: 594.

The author believes that following paracentesis for acute otitis media the ear should have hot compresses for twenty-four to forty-eight hours, after which the ear should be syringed with alcohol. A 33 per cent alcohol solution should be used, to which should be added 2 per cent percaine. This mixture, at a temperature of 37° C., should be used to irrigate the ear gently three to four times a day. This syringing will keep the perforation in the drum open, and shrink down the surrounding tissues, allowing a free discharge. The patient may complain of the sensation of the dilute spirit in the nasopharynx, but this is of no consequence. In two groups of cases taken from two separate scarlet fever hospitals over the same four years the following results were obtained: Hospital 1.—1,650 scarlet fever patients; 157 acute suppurative otitis media (not alcohol-syringed); 44.6 per cent mastoid operations. Hospital 2.—1,107 scarlet fever patients; 139 acute suppurative otitis media (alcohol-syringed); 5.8 per cent mastoid operations.

GUY H. FISK

An Investigation of the Part Played by Allergy or Sensitization as a Factor in Predisposing the Mucous Membrane of the Nasal Passages and the Paranasal Sinuses to Infection, and its Bearing upon the Treatment of Disease of these Cavities. Cameron, J. A. and Munro, J., *Laryngol. & Otol.*, 1935, **50**: 493.

Histological examination of the mucous membrane of the nose and paranasal sinuses reveals definite characteristics in allergic diseases, of which the chief are: infiltration of eosinophile and plasma cells, and œdema of the matrix. The eosinophiles are of two types — bi-lobed with coarse, and mononuclear, with much finer, granules. The latter are more abundant in chronic, the former, in more acute lesions. It is suggested that these cells neutralize some substance liberated in allergy, or that they are a chemiotactic response to its stimulus. There is no evidence to show that these changes are due to microörganisms. The evidence as to whether allergy prepares the nasal mucous membrane for infection by microörganisms is difficult to assess, but so far as statistics show it has no marked effect. When infection supervenes, the mucous membrane shows diminution or disappearance of the eosinophiles.

The usual methods of treatment by desensitization are detailed, and it is noted that surgical procedures are not quite so effective as is generally believed. Finally it is suggested that allergic manifestations may have a common genesis in some form of metabolic poisoning which is usually amenable to detoxication.

GUY H. FISK

Urology

The Cautery Punch Operation for the Removal of Obstructive Lesions at the Vesical Orifice in Women and Children. Caulk, J. R. and Patton, J. F., *J. Urol.*, 1935, **33**: 504.

Obstructions at the internal orifice of the bladder in the male, resulting from bars and contractures have long been recognized as con-

stituting a reasonable proportion of all obstructions. Similarly such lesions occur in the female, and present the symptoms and findings so frequently encountered with prostatism that the condition has aptly been termed "prostatism sans prostate".

Many post-operative cases in women complaining of frequent urination and dysuria have been allowed to progress where the underlying factor may have been interference with the detrusor muscle as a result of surgical insult, or due to the presence of a definite obstructive condition at the internal orifice of the bladder, or a combination of both. The author's interest particularly centred about obstructive lesions at the vesical orifice in children, of which he cites 17 cases (11 males and 6 females). The predominating symptoms in this group were frequency, dysuria, difficult urination, bed-wetting, and renal colic. A history of pyelitis was obtained in nearly every instance, which condition had received prolonged medical treatment without cure and with definite signs of renal impairment. Examination revealed palpable enlargement of the kidneys in 5 instances and in 14 considerable residual urine was demonstrated, with severe renal infections and ureteral regurgitation. These cases showed obstructive lesions at the vesical orifice of the type of contractures, posterior urethral valves, villous masses, and lobules. The author strongly advises the removal of such obstructions by electroresection or by the cautery punch operation through the urethra, avoiding the more radical open operation, which increases the surgical risk.

V. J. BERRY

Periarteritis Nodosa, and Report of a Case with Fatal Perirenal Hæmorrhage. Wever, G. K. and Perry, I., *J. Am. M. Ass.*, 1935, **104**: 1390.

This disease was described by Mayer in 1778, and is characterized by chlorotic marasmus, polymyositis, and polyneuritis, and gastro-intestinal symptoms. Later nephritis was described as a fourth cardinal symptom.

Pathological studies suggest that the causal agent has a predilection for arteries. It produces a patchy destruction of the media. An aneurysm may develop in the weakened wall, or the lumen may be reduced or obliterated by the scar. The aneurysm may be completely walled off from the circulation and may show organization throughout. The usual clinical signs pointing to the involvement of the kidney, which occurs in 75 to 80 per cent of cases, are those of a nephritis. In cases where sudden subcapsular or perirenal hæmorrhage occurs, the condition is confused with an acute surgical kidney. Characteristic retinal changes have been described by some authors, as tubercle-like lesions on the choroidal vessels. Criticism of this suggests that such changes are incidental to chronic nephritis and hypertension with sclerotic changes. The general symptoms of this disease are those of any acute or chronic sepsis. The local manifestations are extremely variable because they are governed by the site of localization of vascular lesions. The author quotes Rothstein and Welt, "Perarteritis nodosa should be considered in every case of acute or chronic sepsis with sterile blood culture and a bizarre symptomatology, unexplainable on a common basis, particularly if associated with a severe anæmia, a febrile course, gastro-intestinal symptoms, manifestations in joint, muscle or skin and signs of renal involvement together with an elevated blood pressure."

Two cases are cited; one of the patients died of post-operative hæmorrhage. A protocol is included.

V. J. BERRY

Therapeutics

Action of Mercurochrome and other Drugs on Normal Human Skin and in Infected Wounds. Hill, J. H., *J. Am. M. Ass.*, 1935, **105**: 100.

The problem of evaluating any antiseptic, particularly one used in a variety of fields, is very complex, because of the many factors involved. This paper, on the basis of new methods, presents additional material in regard to the bactericidal and bacteriostatic action of mercurochrome and other drugs on the skin and in wounds. The drugs used by the author in the various tests were: mercurochrome, aqueous, 2 per cent; mercurochrome, tincture, 2 per cent; merthiolate, tincture; alcohol, 55 per cent, water, 35 per cent, acetone, 10 per cent; tincture of metaphen, 1:200; acriflavine, 1:1000 in saline solution; hexylresorcinol; merthiolate, aqueous; alcohol, 90 per cent; iodine, tincture, 7 per cent. Fingerprint experiments were made, with and without scrubbing of the skin. In the case of experimentally infected wounds tests were made at the end of twenty-four hours and also at various times during the period of healing.

The following conclusions were arrived at. In the case of the skin:— Under conditions of practical use none of the antiseptics studied can invariably sterilize heavily infected skin. Aqueous solutions of antiseptics are not, as a rule, suitable for the sterilization of the skin before operation; both the 2 per cent tincture and the 2 per cent aqueous solution of mercurochrome are bactericidal and bacteriostatic on human skin. Of these the 2 per cent tincture is the superior, and is the best for use before operations. Comparing the bacteriostatic efficiency of preparations of iodine and mercurochrome, the order of efficiency, on the basis of the author's experiments, is as follows: (1) the 2 per cent tincture of mercurochrome; (2) the 7 per cent tincture of iodine, not removed with alcohol;

(3) the 2 per cent aqueous solution of mercurochrome, and (4) the 7 per cent tincture of iodine, removed with alcohol.

In the case of infected wounds:— It is improbable that a single application of any known antiseptic will sterilize a heavily infected wound. There is evidence that while both the tincture and the aqueous solutions of mercurochrome are bacteriostatic in heavily infected wounds, the aqueous solution, under the conditions of the tests, is superior to the tincture of mercurochrome and to the other antiseptics tested, in that it keeps the bacterial count lower and does not interfere with phagocytosis.

According to the author there is urgent need for standard methods of studying the *in vivo* action of antiseptics for special uses. She suggests methods which, with further refinement, may serve as bases for such standards.

JOHN NICHOLLS

Inhalation of Epinephrin for the Relief of Asthmatic Symptoms. Graeser, J. B. and Rowe, A. H., *J. Allergy*, 1935, **6**: 415.

The authors claim that asthmatic attacks can be effectively relieved by the inhalation of a one in one hundred epinephrin solution, in the form of a fine vapour spray. This is as effective as when the drug is given hypodermically. The inhalation treatment has not yet been tried in a case of "status asthmaticus" unrelieved by hypodermic adrenalin. The technique of inhalation is very important. The spray must be in a very fine state of division, such as ordinary atomizers fail to provide.

Inhalation of epinephrin rarely causes the nervousness and tachycardia which often occurs following the hypodermic use of this drug.

T. G. HEATON

Anæsthesia

Evipan as an Intravenous Anæsthetic. Jarman, R. and Abel, A. L., *Anæsthesia & Analgesia*, 1935, **14**: 54.

The present article summarizes the results obtained from over 2,000 administrations of evipan as a basal or complete anæsthetic. The use of nembutal with evipan is deprecated, as this depresses the respirations unduly. This only proves again that it is unwise to mix two barbiturates. The authors use evipan in two distinct types of case, (1) minor operations on out-patients, and (2) operations on in-patients.

Anæsthesia for out-patients is usually required only for a few moments, and no premedication is necessary. The minimum dose of evipan is given, usually 2.5 to 3 c.c., intravenously. The patient is awake in two or three minutes and is able to go home after 20 to 30 minutes. The first 2.5 or 3 c.c. are injected fairly quickly (in five to ten seconds), and then a pause of 30 seconds is made to allow for the complete circulation of the blood. If consciousness is not lost then, a further 2 to 3 c.c. are injected and the operation performed.

For operations on in-patients premedication is given. That found most suitable is the Hoffman-la Roche preparation, containing omnopon, gr. 2/3, and scopolamine, gr. 1/150, for all patients between the ages of 16 to 70 years. Half of this is given to a large child or an older person. The injection is given one hour before the evipan. The evipan is given according to the technique described above, at the rate of 1 c.c. every two or three seconds. For minor operations the full dose of 10 c.c. is given. In the case of major operations the full dose may be repeated as often as required during the operation. The maximum number of times it has been found necessary to repeat the injection has been four, over a period of two hours.

Evipan may be supplemented by gas and oxygen, or spinal anæsthesia. The authors do not advise that ether be given with evipan, and have found that nitrous oxide and oxygen has proved sufficient. They again stress the importance of maintaining a free airway at all times, and therefore maintain that evipan should never be administered single-handed except in the most unusual circumstances. As an antidote for general collapse coramine (5 to 10 c.c.) is the best available; for purely respiratory failure, alpha-lobelin, gr. 3/20, intravenously, or direct respiratory insufflation with 7½ per cent carbon dioxide with oxygen is helpful.

ARTHUR WILKINSON

Hygiene and Public Health

The Urinary Excretion of Silica by Persons Exposed to Silica Dust. Bloomfield, J. J., Sayers, R. R. and Goldman, F. H., *Pub. Health Rep.*, 1935, **50**: 421.

This study was undertaken for the purpose of obtaining further evidence that the lung charges associated with the inhalation of dust in the anthracite coal industry are caused by an exposure to both coal and silica dust. It confirms work previously reported by King and Dolan in 1934, which showed that the urinary excretion of silica is at a higher level in persons exposed to silica dust than in normal persons. One hundred and twenty anthracite coal miners were found to have silica in their urine varying in amount from 0.6 to 11.5 mg. per 100 c.c.; the average was 2.5 mg. Normal persons were found to be excreting an average of 1 mg. per 100 c.c. A close correlation was found between the silica dust exposure of these men for a specified number of years and the amount of urinary silica.

FRANK G. PEDLEY

Obituaries

Dr. Carl Overy Apps, of Mount Pleasant, Ont., died on July 31, 1935. He was born in 1895 and was a graduate of McGill University (1923).

Dr. Alexander Bell, one of the oldest physicians in Ontario, and the oldest living graduate of Queen's University, died in Toronto on September 1, 1935. He was Medical Health Officer of the City of Peterborough and County Coroner for several years.

Dr. Bell was born in Carleton Place, February 22, 1844. He graduated in medicine from Queen's University (1865) at the age of 20. Too young to practise medicine in Canada, he joined the American Medical Corps during the Civil War and marched across Georgia with Sheridan's army. After the war he started a civil practice at Lakefield, in Peterborough County. He maintained his practice there and in Peterborough for 50 years. At one time he was clerk and chief municipal officer of Lakefield. He was also a veteran of the Fenian Raids of 1866. For 69 years he was a member of Clementi Lodge, A.F. and A.M., and for 55 years a member of the Canadian Order of Foresters.

His father was the late James Bell, of Perth, and his grandfather the late Rev. William Bell, first Presbyterian minister in the Ottawa Valley.

Three daughters and three sons survive. They are: Mrs. E. L. Crawford, Toronto; Mrs. D. C. Gale, Victoria; Mrs. Fred Robinson, California, Allen C. Bell, Boston, and Norman E. and Charles V. Bell, Toronto. Dr. Charles N. Bell, of Winnipeg, is a brother.

Dr. Duncan G. Cameron, of Medstead, Sask., was fatally injured in a motor accident near North Battleford, Sask., dying on August 20, 1935. He graduated from Trinity Medical College, the year it became affiliated with the Toronto University. He served his internship in the Hospital for Sick Children and was made house surgeon. He went to Saskatoon in 1900, establishing himself as the leading child specialist of that city. In 1920, he and his family moved to Windsor, Ont., where he practised for ten years. He returned West in 1930 and settled at Medstead as physician for the Canadian Pacific Railway Construction Department, during the building of the northern line between Prince Albert and Meadow Lake. During the war he was medical officer with the Saskatoon Highlanders. His wife; one daughter, Eleanor; a brother, Dr. Donald A. Cameron, of London; two sisters, Mrs. Kate Reycraft, Kalamazoo, Mich., and Mrs. James Robb, Wallacetown, Ont., survive.

Dr. Lewis Henry Campbell, of Bradford, Ont., died on August 19, 1935. He was a graduate of the University of Toronto (1892).

Lt.-Col. Frederick Burke Carron, of Brockville, Ont., died on August 25, 1935, after an illness of several months. He was 65 years old. He was born in Brockville, a son of the late James Carron and graduated in medicine from McGill University, Montreal (1898). He served on the surgical staff of the Royal Victoria Hospital, Montreal, for a year before taking post-graduate work in London, England (L.R.C.P., M.R.C.S.).

While in England, he enlisted for service in South Africa at the time of the Boer War, and was once taken prisoner by the Boers, but escaped. When commander of a hospital in Cape Colony, Dr. Carron was personal physician to Sir John French.

After service for some years as a ship's surgeon, he practised here from 1905 to 1914 when he volunteered for service overseas with the Canadian Army Medical Corps. He was in succession Inspector of Hospitals and Deputy Assistant Director of Medical Services in the Shorncliffe area, Medical Officer of the Third Canadian Divisional Engineers in France, and second in command of a Canadian special hospital in England.

In 1919 Dr. Carron resumed practice in Brockville, where he was attached to the staffs of hospitals in the city. Unmarried and predeceased by a brother and sister, he is survived only by a cousin, A. B. Henderson, of Brockville.

Dr. Thomas Holmes Middlebro. In the last issue of the *Journal* a brief notice was given of the death of Dr. T. H. Middlebro, who died on July 16, 1935. Since then the following additional particulars have come to hand.

Two years ago Dr. Middlebro suffered a concussion of the brain in a motor accident near Guelph and although since that time he had not enjoyed the full use of his faculties, his condition lately was not thought to be any worse.

Upon arising on the morning of July 16th, he went, as usual, down town for his paper and shortly after returning home was stricken with coronary thrombosis. He died shortly before six o'clock in the afternoon.

Dr. Middlebro was in his 72nd year, having been born on August 11, 1864, in the township of Sydenham, a few miles from Owen Sound. He received his early education at the Old Stone School, which is now Strathcona Public School, and later at the Model School in Collingwood. Upon graduating from model school he taught in a number of places, including Orillia and Orangeville.

After a number of years of teaching he enrolled in the medical course at the University of Toronto Medical College. During the first three years of his course he was the Gold Medalist of his class and upon graduation he was awarded the Silver Medal, while Lieutenant-Governor Herbert A. Bruce was the Gold Medalist.

Following his graduation in 1892 he continued his studies in London, England, where he obtained his F.R.C.S. degree. Further post-graduate work took Dr. Middlebro to the United States, and in 1911 he studied x-ray in Vienna. After his brilliant career as a student Dr. Middlebro commenced to practise in Owen Sound, where he had practised until his motor accident. For a number of years he was surgeon-in-chief at the General and Marine Hospital in Owen Sound.

Dr. Middlebro was a member of St. George's Anglican Church and in fraternal circles was a member of the Sons of England, and the Independent Order of Foresters. He also was a charter member of the Owen Sound Kiwanis Club. For a period of 12 years he had been an examiner on the Ontario Medical Council.

Dr. Middlebro was known all over the country and was recognized as one of the leading surgeons in the Dominion. He was known to the citizens of Owen Sound as a man who had lived a life of sacrifice and service and one who was always ready to do anything in his power for those in distress.

Besides his widow, he is survived by one sister, Mrs. Wm. Douglas, of Owen Sound; three brothers, John G. Middlebro, W. S. Middlebro, K.C., and H. E. Middlebro, also of Owen Sound. Six children also survive: Harding, Dr. Arthur and Dr. J. P. Middlebro; Lois, Ruth and Mrs. R. F. B. Cooley, of Toronto.

Dr. Harry MacDonald Parnell, of St. Catharines, Ont., died suddenly on August 9, 1935. He was born in 1900, the only son of Mr. and Mrs. Fred. R. Parnell, and a graduate of the University of Toronto (1923).

News Items

Great Britain

Conference for Medical Officers in Industry Overseas.—A meeting was held at the Ross Institute of Tropical Hygiene, London School of Hygiene and Tropical Medicine, Keppel Street (Gower Street), London, W.C.1, on July 9, 1935, to discuss the advisability of holding an Annual Conference at the School to enable Medical Officers in Industry overseas, when on leave, to meet together and review their various problems. Prof. W. W. Jameson, Dean of the London School of Hygiene and Tropical Medicine, was in the Chair.

The meeting was unanimous in the opinion that the London School of Hygiene and Tropical Medicine would be rendering a useful service in affording an opportunity to Medical Officers in Industry to use the Ross Institute as their Headquarters when on leave and to meet together for the discussion of matters of professional interest.

The proposed Conference will not conflict in any way with that which is arranged by the British Medical Association in connection with its Annual Meetings, where matters of medico-political interest to overseas practitioners are dealt with specially. The discussions which it is suggested might with advantage take place at the London School deal with the more practical and scientific side of professional work overseas.

It was agreed that, at first, a Conference lasting one day should be held in the beginning of July each year, and that if possible invitations to attend the Conference should be issued through the medium of the British Medical Association and the various Industrial Associations. It was decided also that any Government Health Officers home on leave from overseas should be invited to attend, and that the Conference should be kept as informal as possible, so as to allow of free discussion of any subject put forward by the Medical Officers present.

The Sebag-Montefiore Research Fellowship.—A vacancy exists for a Research Fellow to work in Morbid Anatomy. The appointment is whole time and non-resident. The appointment in the first place is for one year, but is renewable; salary £500 per annum. Candidates must be registered medical practitioners and have some training in Pathological Anatomy and Histology.

Applications accompanied by copies of not more than three testimonials, given specially for the purpose, must be delivered to the undersigned not later than November 25, 1935.

All candidates must be in attendance to appear before the Joint Committee, if required, at their Meeting on Wednesday, November 27, 1935, at 4.45 p.m. Duties to be taken up in January, 1936, or subsequently by arrangement.

Forms of application and copy of the rules for the appointment will be supplied on application.

HERBERT F. RUTHERFORD, *Secretary.*
The Hospital for Sick Children,
Great Ormond Street,
London, W.C.1.

Alberta

The Health Insurance project which the late Farmer Government had intended to put into partial operation at an early date will likely be retarded on account of a lack of funds. Should the Social Credit scheme be found workable prompt development may take place.

For the first time in the history of the Provincial Government, a physician occupies the position of Minister of Health. Dr. W. W. Cross, a graduate of Toronto University and until recently in active practice at Hanna, has been appointed to this office. He has been a resident of Alberta since 1914. He is well thought of by our profession and much will be expected of him.

The projected new mental hospital at Oliver will not likely be built. It was to have cost one hundred thousand dollars. The expenditure of such an amount at the present time is considered to be unwarranted.

It has been suggested that contracts should be made between doctors and individual municipalities, on the basis that all unpaid accounts twelve months over due be presented to the municipality. The physician would be entitled to a grant equal to 15 per cent of his account. In no instance would the amount paid be greater than 15 per cent, nor would the physician be paid the 15 per cent of his account if he has collected over 20 per cent of it, but enough of the 15 per cent will be paid to bring the amount up to 35 per cent of the account at regular rates.

A new constitution for the Alberta Medical Association will be submitted for approval, at the meeting of this Association on September 16th, 17th and 18th, at Edmonton. In this will be embodied the principles of a Council or Board of Representatives which will conduct the business of the Association. This Board will be thoroughly representative of the physicians of the province and will be composed of sixty members. The last seven past-presidents and all of the members of the Council of the College of Physicians and Surgeons of Alberta will be included. There will be a full set up of committees corresponding to those of the Canadian Medical Association. The district medical societies will also be represented.

Dr. D. S. Macnab, President of the Alberta Medical Association is now in the Peace River District, where he is completing a tour of organization of all of the district medical societies in the Province.

Dr. S. C. W. Morris, of Calgary, left recently to attend the American Congress of Physical Therapy at Kansas City. He will also visit New York and Chicago where he will take post-graduate courses in diseases of the skin and scalp. G. E. LEARMONTH

British Columbia

Dr. Allan Peebles, the recently appointed technical advisor on Health Insurance to the Provincial Government, in the course of an address before the convention of the British Columbia Pharmaceutical Association, on August 7th, stated as his belief that within ten years the majority of the provinces in Canada would have state health-insurance.

In the course of his further remarks outlining the terms of the proposed Bill for Health Insurance now being considered, Dr. Peebles stated that in his view full federal control of the scheme would be inadvisable, on account of varying local conditions.

Fred. W. Heath, member of the council of the Alberta Pharmaceutical Association, criticized the provision in the present bill which compelled inclusion under the Act of those whose incomes do not exceed $200.00 per month. He felt that there was no necessity of making it apply to those whose incomes exceeded $150.00.

Hon. G. M. Weir, Provincial Secretary, has named a representative public committee to hear criticism and comment on the Health Insurance bill as now drafted. He emphasized that the purpose of the committee was not to investigate the advisability of health insurance, since the policy of its inauguration in British Columbia has definitely been adopted. The committee has the

following composition: Percy R. Bengough, general secretary, Vancouver and District Trades and Labour Council; Miss Grace Fairley, R.N., superintendent of nurses, Vancouver General Hospital; Grant Fleming, M.D., Professor of Public Health, McGill University, and secretary of the Committee on Economics of the Canadian Medical Association; J. H. McDonald, (New Westminster) member of the Executive Committee of the Canadian Manufacturers' Association; E. W. Neel, (Duncan), president of the British Columbia Hospitals' Association; and Allan Peebles, Ph.D., technical adviser to the Provincial Government on health insurance, (chairman). To these are added as consultants to aid the committee, H. M. Cassidy, Ph.D., director of social welfare for British Columbia; C. F. Davie, K.C., and J. J. Gillis, M.D., M.L.A. for Merritt, chairman and member respectively of the 1929 British Columbia Royal Commission on Health Insurance and Maternity Benefits; A. K. Haywood, M.D., superintendent of Vancouver General Hospital; Hon. G. S. Pearson, Minister of Labour and member of the 1929 Royal Commission; Mrs. H. D. Smith, M.L.A., chairman of Vancouver School Board; E. S. H. Winn, commissioner of the Workmen's Compensation Board and former chairman of the 1920 committee to enquire into health insurance and mothers' pensions; and H. E. Young, M.D., Provincial Health Officer.

Dr. Frederick Kincade, formerly of Tranquille Sanitarium, has been appointed by the provincial government to take charge of a free travelling tuberculosis clinic on Vancouver Island. He will maintain headquarters and a local clinic in Victoria, and in general conduct the work on Vancouver Island formerly carried on by Dr. C. S. Lamb as part of his provincial work.

At a meeting of the board of directors of the Vancouver General Hospital recently, Dr. B. W. Gillies stated that if the proposed health insurance bill is passed in its present form, the hospital would have to increase its present bed accommodation by 60 to 75 per cent. He also drew attention to the fact that the hospital ration rate provided for in the bill was considerably greater than the rate in practice in the city, which would have many far-reaching effects.

Having regard to the "hearings committee", whose appointment is noted above, holding a meeting in Vancouver on September 9th, the hospital board appointed a special committee of the following four members; Dr. H. W. Riggs, Messrs. F. J. Burd, J. H. McVety and J. E. Thompson, to study the bill and report to the board before that date.

A party of 147 medical men and women and members of their families reached Vancouver by special train at 8.30 a.m. on August 12th, en route to the meeting of the British Medical Association in Melbourne. Among the party were Mr. H. S. Souttar, C.B.E., chairman of the Representative Body of the British Medical Association, Dr. Watson Smith, F.R.C.P., and Professor John Fairbairn, president of the College of Gynæcology and Obstetrics, London. The visitors were met by about fifty members of the Vancouver Medical Association with cars, and for two hours were driven about the city and suburbs. They embarked on the R.M.S. *Aorangi*, and sailed at 11 a.m. for San Francisco, where the remainder of the delegation to Melbourne who crossed the continent through the United States would join the ship.

In his annual report for 1934, which has just appeared, Dr. J. W. McIntosh, Medical Health Officer for Vancouver, has drawn special attention to the great reduction in the number of deaths from heart trouble in the lower age groups. In 1914, 34.3 per cent of the deaths from heart trouble were under the age of 40 years, while in 1934 they were only 5.4 per cent. The death rate from this cause for 100,000 of the total population for 1914 for persons under the age of 40 years was 29.8, and for 1934, 13.1. The reduction in the earlier years of life is believed to be attributable to the early discovery and elimination of foci of infection, and the successful campaigns for use of toxoid against diphtheria in children of pre-school and school ages by the Division of Child Hygiene of the Health Department, the School Medical Department, and other kindred agencies. The infantile mortality rate in Vancouver continues to decrease and is believed to be the lowest of any city of its size in the world. The figure for total deaths under one year for 1,000 births was 23.5 for 1934.

D. E. H. CLEVELAND

Manitoba

At the recent examinations of the Royal Army Medical College, London, Eng., Dr. Stuart Musgrove, late of Winnipeg, obtained first place in Pathology, Surgery and Tropical Medicine, and won the Grand Aggregate.

Dr. R. Brodie Anderson, Winnipeg, has been appointed as Medical Health Officer at Churchill and will take up his new duties shortly.

Dr. Wm. J. Boyd has accepted a position as Assistant in Vita General Hospital, Vita, Manitoba.

The twenty-fifth anniversary of the founding of the Manitoba Sanatorium at Ninette was celebrated on September 14th. The Lieutenant-Governor and Premier of Manitoba, the Mayor of Winnipeg, and members of the Sanatorium Board went out from Winnipeg to Ninette in a private car. Dr. D. A. Stewart, Superintendent of the institution, acted as host. After a buffet luncheon a meeting was held in the assembly hall of the sanatorium where Mr. John McEachern, Chairman of the Board, presided. A number of short addresses were given congratulating the sanatorium on the completion of its first quarter century. High-tea was served at 5 o'clock, and shortly thereafter the visitors left by train or by car.

A tablet in memory of Dr. Spurgeon Campbell was unveiled on August 22nd, at Lakeside Fresh Air Camp, three miles west of Gimli. In addition to the visitors one hundred little girl guests of the camp were present at the ceremony. The late Dr. Campbell was actively interested in this camp.

In the Dominion Track and Field Championship held at Winnipeg, August 9th and 10th, Dr. Clive Nelson won second place in the discus throw, and third in putting the shot.

ROSS MITCHELL

New Brunswick

The annual meeting of the Maritime Conference of the Catholic Hospital Association was held at the Hôtel-Dieu Hospital in Chatham. The presidential address was presented by Sister Kerr, R.N., Campbellton. Sister Mae Peter, Antigonish, delivered an interesting address on Group Hospitalization. Hon. Dr. Wm. F. Roberts, Minister of Health for New Brunswick, detailed to the Conference the organization of the various branches of the Department of Health. Miss J. Leger, of Campbellton, was elected president for the ensuing year.

Dr. W. E. Rowley, of Saint John, is still confined to hospital, but his progress towards recovery is reported to be satisfactory.

Dr. A. B. Walter, of Saint John, is at present doing post-graduate work in cardiology in Boston.

A. STANLEY KIRKLAND

Nova Scotia

The Halifax Branch of the Medical Society of Nova Scotia during the past month held a combined meeting with the members of the Halifax Dental Society at the Ashburn Golf and Country Club. The meeting took the form of a golf competition in the afternoon between the members of the two Societies and a dinner in the evening. The meeting was well attended and afforded an opportunity for the members of the two Societies to meet one another. As in the previous year, Dr. P. A. MacDonald was the outstanding golfer, winning the prize for the best gross score, the best net score, and the sealed hole competition. The cup presented for annual competition by past presidents of this Society was presented to the winner by Dr. H. W. Schwartz, who presided.

Dr. Sidney Gilchrist, Medical Missionary to Portuguese West Africa, sailed from Halifax to resume his duties. During his furlough he attended post-graduate courses in Chicago and in Montreal.

Two of Philadelphia's prominent physicians, both of the staff of the Graduate School of the University of Pennsylvania are spending vacations in the province. They are Drs. H. R. Hawthorne and Karl Kornblaum. Several other prominent United States physicians are spending vacations at Chester and Bedford. Of these Dr. Luther MacKenzie, of Bellevue Hospital, and Dr. Ross Faulkner, lectured at the Refresher Course conducted by Dalhousie University during the last week in August.

The Dalhousie University Refresher Course was held from August 26th to 30th. One hundred and six practitioners were in attendance, an increase of twelve over last year's total. Visiting lecturers included Dr. Edward Hodge, of Philadelphia, Dr. E. E. Cleaver, of Toronto, Dr. Martin Silberberg, formerly Professor of Pathology at Breslau University and now Carnegie Research Scholar at Dalhousie University, and Dr. A. F. Miller, of Kentville Sanatorium. There seems to be no doubt as to the value of the Refresher Course, for the attendance is always quite large.

Dr. Anna M. Wallace of the staff of the Walter E. Fernald State School for Mental Defects at Waverley, Mass., is retiring this year from a position she has held for 40 years. She was the first woman physician on the Staff of the School. Dr. Wallace is a native of West Gore.

Nova Scotian-born practitioners who have died during the past month are Dr. John A. McIsaac, of New York, and Dr. George R. Morse, of Saskatoon. The latter was a graduate of Dalhousie University.

N. B. DREYER

Ontario

By an Order-in-Council dated July 19th, regulations have been issued by the Division of Tuberculosis Prevention, Department of Health, requiring that every nurse employed in a hospital or sanatorium shall receive a tuberculin test and that all those who react shall have an x-ray examination. Those nurses who are negative are to have an additional tuberculin test within a year. Each reactor is to have an x-ray examination of the lungs once each year during the period of her employment. No nurse in training is to be detailed to care for patients suffering from tuberculosis until she has received proper instruction to protect herself against infection. The standardized tuberculin prepared by the Connaught Laboratories is recommended, and tests are to be intracutaneous and the amount used to be 1/10 of 1 c.c. containing 1/100 of a mg. of tuberculin.

On or about August 23rd the medical profession of the Province of Ontario was notified that, from September 1st, all medical relief payments heretofore guaranteed by the Province of Ontario would cease. The Secretary of the Ontario Medical Association then notified the profession that it would be necessary to cancel all arrangements and to dispense with the efficient system of accounting and payment which had been developed to deal with medical relief throughout the province. On August 30th, another letter was sent to each physician of the province notifying them that the Government had retracted their new order and that the previous arrangement would be carried on until the end of the year. Under the present arrangement the Government pays to the Ontario Medical Association twenty-five cents per month for each person on relief. This fund is distributed pro-rata by the Ontario Medical Association to the doctors who have been called in attendance on recipients of relief.

Many physicians will hear with regret of the unexpected death, after a short illness, of Reverend Sister St. Philip, formerly Miss Julia Wanner, of Kitchener, at St. Michael's Hospital. When St. Michael's Hospital first opened its door in July, 1892, Sister St. Philip entered the institution as a pupil nurse and was attached to the Hospital for the remainder of her life. Sister St. Philip was largely responsible for the planning of the operating suite of the Hospital and was for a long time Instructor of Nurses there.

Dr. R. D. Rudolf, of Toronto, is a delegate from the Canadian Medical Association to the annual meeting of the British Medical Association in Melbourne, Australia.

J. H. ELLIOTT

Dr. J. H. Elliott, Professor of History of Medicine of the University of Toronto, is attending the Tenth International Congress on the History of Medicine at Madrid and Toledo, Spain, September 22 to 29, 1935. Dr. Elliott expects to return about the end of October. Sir Humphry Rolleston is a member of the British delegation to this Congress and will occupy the Chair at one of the sessions.

T.C.R.

Quebec

As all medical men know, who are brought into close contact with the services to the public in hospitals, the hospital personnel, both medical and non-medical, has long been exploited in an unwarrantable fashion. Relying upon the almost proverbial good nature of the doctors and their altruistic turn of mind many sick or near-sick demand their services in out-patient departments and even in the public wards on a free basis, when they could very well afford to pay an outside doctor, if not his full fee, at least something. Patients have been known, for instance, to drive up to an out-patient department in automobiles, sometimes wearing expensive furs, and have received free treatment. In the case of the English hospitals social service departments are maintained, an important part of whose duty is to look up the antecedents of those asking for free treatment, with the idea of ascertaining their financial condition. This has brought about some improvement, but no one will deny that abuses still exist. The matter is complicated at the present time by the fact that a large number of people are on relief, and some of these while away the time by going from clinic to clinic, often with little the matter with them. Thus the time of the doctors attending is wasted, and they might be better employed.

Bound up with this is the consideration that the indigent sick, like the indigent poor, should be the wards of the state, and the medical men, who pay their share of the taxes like those in other walks of life, should be remunerated by the state for their services. It is not always remembered in this connection that a doctor pays an annual fee to maintain his professional position in the community and, moreover, pays a business tax for the privilege of maintaining an office. So why should he be expected to give his services in preparation for which he has spent much money, time, and energy, for nothing? The question has been asked for long and all over Canada. But the answer comes slowly and the solution slower still. At last, however, something is to be done about it in Montreal, or so we hope. The medical men attached to the out-patient departments and the public services of four of the leading French hospitals in the city are putting up a vigorous protest. These hospitals are the Nôtre-Dame, Hôtel-Dieu, Ste. Jeanne d'Arc, and St. Luc. The doctors in question have decided not to render their services gratuitously after September 24th, in the case of the out-patient services and after October 1st, in the case of the public ward patients, except in cases of urgent necessity. They have taken steps to place their arguments before Premier Taschereau, and it is hoped that some satisfactory arrangement can be arrived at.

The whole matter was discussed fully at a general conference held in the Cercle Universitaire on July 24th, convened by the Bureau of the General Association of Hospital Physicians, which was attended by representatives of various French hospitals and many others interested. The principle of paying indemnities to hospital medical staffs was approved. The permanent committee of the Bureau brought forward the following considerations:

1. The Association of Hospital Physicians is definitely against the direct payment of hospital physicians by the State or the Municipality. It asks, however, the public administration for a just and reasonable contribution of money.

2. A fund should be formed in each hospital which would be called the "Medical Fund", to be divided among the physicians on a plan which would be the same for all hospitals.

3. The "Medical Fund" would be administered by a "Committee of Administration of the Medical Fund" elected by the regular physicians of the hospitals. This committee would account for its administration to the Medical Board as well as to the Board of Management of each hospital.

4. It is not the business of the Association of Hospital Physicians to discuss whence the funds should be derived.

5. Inasmuch as the payment of the money is not to be regarded as an honorarium but rather an indemnity for expense of transportation and loss of time, etc. it would seem reasonable to make a difference between the heads of departments, assistant-directors, and simple assistants.

6. The indemnities which the hospital physicians will ask of the hospital administrations are the following: For the head of a service, $2,000 a year; for assistant-directors, $1,500 a year; and for every regular assistant in a regular hospital service, 1,200 a year.

The medical men present felt that out-patient departments should exist for the care of urgent cases only; that out-patient departments should serve to feed the hospital beds, that is, should be regarded merely as parts of the admitting service; that the attending physicians in the out-door should be allowed to use his judgment and give his time only to such cases as are of scientific interest; the out-patient department ought not to be a place for the treatment of chronic ailments; patients should be sent back to their own doctors if they can pay a fee, be it ever so little; that the Commission on Indigency should furnish them with the means to be treated, as in Ontario and elsewhere, if they are without work; and that, except in cases of scientific interest, no patient should present himself at an out-patient dispensary more than once.

Hon. L. A. David, Provincial Secretary, has announced that an anti-tuberculosis clinic will soon be added to l'Assistance Maternelle at Montreal. Children born of parents affected by tuberculosis will be innoculated at birth with anti-tuberculosis serum. This will mark the first time on the North American continent that a clinic of the sort has been added to a maternity hospital. The Government intends to extend the work to hospitals in other cities and towns after it has been thoroughly tested in Montreal.

Dr. C. F. Martin, Dean of the Medical Faculty of McGill University, has received the honorary degree of D.C.L. from Bishop's University, Lennoxville.

United States

Our British Visitors.—One large group of British visitors en route to the meeting of the British Medical Association in Melbourne, Australia, arrived at New York early in August. Another large group of tourists made the trip by way of Canada. The group that passed through the United States included not only four representatives of the official bodies of the British Medical Association but also many distinguished British physicians whose names mean much in the fields of science and medical literature, as well as a great number of general practitioners from various parts of the British dominion.

"In New York the visitors were met on the *Georgic* by representatives of the New York State Medical Society and the American Medical Association. An official reception was held before the boat docked. They were entertained with a tour into the country under police escort and with a dinner for the leading officials on August 4th. On August 5th they were shown through the leading medical institutions in New York City and also made a visit to Radio City and the music hall, ending their official visit with a luncheon at the Waldorf-Astoria. In Washington, D.C., they were received at the White House, visited all the notable buildings and were tendered a luncheon by representatives of the Medical Society of the District of Columbia and of the various official medical associations in the capital city. In Chicago the visitors were taken on a tour through the city to see the various medical institutions and were given a luncheon at the stockyards and a tea at the Edgewater Beach Hotel, completing the day with a dinner at the Hotel Stevens and with several private parties. Arrangements have also been made by the official medical organizations of New Mexico, Williams, Ariz., Los Angeles and San Francisco to provide suitably for our British guests.

"Dr. E. Kaye Le Fleming, chairman of the council of the British Medical Association, Dr. G. C. Anderson, secretary, Dr. N. Bishop Harman, treasurer, and Dr. H. G. Dain, deputy chairman of the representative body, expressed the warmest gratitude for the manner in which their American colleagues had made them welcome. Moreover, such noted guests as Prof. John Bright Banister, Sir Comyns Berkeley and Sir Ewen Maclean, were hearty in their praise of American advancement in these fields. Sir Henry Gauvain, noted authority on surgical tuberculosis, and Prof. Ernest William Hey Groves, author of one of the most widely used text-books in surgery, complimented American institutions and gave demonstrations and lectures en route.

"Among the noted guests in the party were George Carmichael Low, renowned for his contributions in the field of tropical medicine; Albert Clifford Morson, urologist; Sir James Purves-Stewart, neuro-

logist; David Waterson, anatomist, and Prof. Robert Hughes Parry, medical officer of health and pathologist. The party included also a goodly number of women physicians, distinguished ladies, and charming young people.

"The American Medical Association was glad to extend the hand of greeting officially to our British colleagues and to provide for their entertainment. They in turn, by the warmth of their appreciation and cordiality, did much to cement the friendship between the physicians of the two great English speaking nations."—Slightly altered from the *J. Am. M. Ass.*, Aug., 17, 1935, **105:**

General

Sixty-fourth Annual Convention of the American Public Health Association.—Leaders of public health and preventive medicine from every state of the union, from Canada and from several foreign countries are to be at hand for the sixty-fourth annual convention of the American Public Health Association to be held in Milwaukee from October 7th to 10th. Workers in all fields of public health, medical men, nurses, specialists in research, and others in allied actitvities are to be among the 3,000 delegates expected at the convention.

Simultaneously with the Association's sessions, ten other closely related organizations are to convene. They are the Association of Dairy, Food and Drug Officials, American Association of School Physicians, Association of Women in Public Health, Conference of State Sanitary Engineers, Conference of State Laboratory Directors, Conference of Wisconsin Health Officers, State Registration Executives and States Directors of Public Health Nursing, International Society of Medical Officers of Health, and National Committee of Health Council Executives.

Over 400 papers are to be presented, dealing with such widely varied subjects as mental hygiene, diphtheria and scarlet fever immunization, filterable viruses, poison in food, public sanitation, treatment of sewage and polluted waterways, public health engineering, planned milk control, laboratory studies with toxins and vaccines, tuberculosis, amœbic dysentery, whooping-cough, gonococcal infection, undulant fever, milk-borne disease, water purification, new methods in reporting vital statistics, industrial hygiene, food and nutrition.

The sessions of the Association itself are to be divided among its ten constituent Sections—health officers, laboratory, vital statistics, public health engineering, industrial hygiene, food and nutrition, child hygiene, public health education, public health nursing and epidemiology.

Among the outstanding physicians and health leaders who will speak at the convention are: Dr. E. L. Bishop, President of the Association and Director of Health of the Tennessee Valley Authority; Dr. Walter H. Brown, President-elect of the Association and Professor of Hygiene at Stanford University in Palo Alto, Calif.; Dr. Herman N. Bundesen, President, Board of Health, Chicago; Dr. W. G. Campbell, Chief of the United States food and drug administration, Washington; Dr. William H. Park, Director, Bureau of Laboratories, Health Department, New York, N.Y.; Dr. A. J. Carlson, Professor of Physiology, University of Chicago. Others include: Dr. Haven Emerson, Professor of Public Health Practice, Columbia University; Dr. John A. Ferrell, Associate Director, International Health Division, Rockefeller Foundation, New York; Dr. Morris Fishbein, Editor, *Journal of the American Medical Association*; Dr. Grant Fleming, Professor of Public Health, McGill University, Montreal; Dr. Iago Galdston, Executive Secretary, Medical Information Bureau, New York; Dr. John P. Koehler, Milwaukee Health Commissioner; Dr. Carl S. Pederson, Chief in Research, Agricultural Experiment Station, Cornell University. The health commissioners of most large cities and research men on the staff of foundations and major industries are also on the program.

Among the Canadians taking part are Prof. Grant Fleming, Montreal; G. F. Amyot, North Vancouver; C. K. Johns, Ottawa; J. T. Phair, Toronto; H. L. MacNabb, Toronto; H. R. Thornton, Edmonton; and E. A. Watson, Hull.

This great congress, which has an enviable record for scientific contributions, is designed to appeal to members of the public health and medical professions alike. The headquarters are to be at the Milwaukee Auditorium.

Book Reviews

The Principles and Practice of Urology. Frank Hinman, A.B., M.D., Clinical Professor of Urology, University of California Medical School. 1,111 pages, illustrated. Cloth, $11.50. W. B. Saunders, London and Philadelphia; McAinsh, Toronto, 1935.

It is the considered opinion of the reviewer that this is the finest publication on the principles and practice of urology that has yet appeared in the English language. Indeed it ranks favourably in many respects with the much more extensive, many-volumed treatises, the German "Handbuch der Urologie", and the French "Encylopædie d'Urologie".

It is not possible to refer to all its many admirable features. The printing leaves nothing to be desired. The illustrations, diagrammatic and photographic, are numerous, instructive and well produced. They add much to the value of the book.

The first sections of the book, comprising 245 pages are devoted to the comparative anatomy of the urogenital tract, the development of the urogenital tract in man and its normal structure and function. While much of this may be found in standard works, the author's presentation is novel and interesting, and goes far to justify the unusual elaborateness devoted to it. We must confess, however, to being somewhat appalled by the diagrams on urogenital development, and have feared to make any serious attempts to decipher them in the high temperatures now prevailing! The various anomalies are described very thoroughly, and with a clear and easily intelligible presentation of their developmental basis.

Particular attention is devoted to the effects of urinary obstructions and stasis. This is a noteworthy chapter, and embodies the researches of Dr. Hinman in a field he has made peculiarly his own. Noteworthy is the discussion by the author of his own theory, now generally accepted, of the production of hydronephrotic atrophy.

The author has a flair for classification. This is well shown in his endeavour to classify the various tumours met with in the urogenital tract.

No fact in urology seems to have been too minute to be omitted. In fact, it is extraordinary to find so much in the relatively small compass of 1,100 pages. On the other hand, the subject of urinary lithiasis does not seem to have been given the attention it deserves. One hesitates to criticize in the face of so much that is admirable, but a brief historical résumé of each subject, in our opinion, would have added to the value of the work. Undoubtedly, the limitations of space and the desire to keep the book within the limits of one volume have influenced the author and necessitated abridgement here and there. And yet, while reviewing, we have repeatedly wished that the one volume had been expanded into two, particularly as the impression of abridgement towards the end of the volume was inescapable. This expansion would have

permitted the valuable bibliography being included, even if in abbreviated form. The author's method of making the reader find the references in a medical index we found in one instance to fail completely. This method involves much trouble, as few of us have access to medical indices, except in a medical library. While there is something to be said for the author's method, we feel that the method used by Ewing, in his "Neoplastic Diseases", is much preferable, even if it entails adding another fifty pages or more to the book.

The work is thorough in almost every respect. It has obviously entailed an extensive study and analysis of the literature. It is characterized throughout by sane and sound thinking, and equally clear and concise writing, without waste verbiage. The author's judgments on matter of opinion are at all time sound and conservative.

The author states in his preface that the volume "includes everything necessary for the instruction of the medical student, covers the field completely for the general practitioner, and should prove of interest and value as a reference book to the trained urologist." In our opinion, it is as a book of reference that its chief worth will lie. It is perhaps too comprehensive, too perfect, for the use of the average medical student. In that completeness, however, will be found its value for teachers and advanced workers in urology.

Up to the present, we have not had a good treatise on urology, written in the English language. This book is the nearest and finest approach we have yet met with. It is, in every way, a splendid accomplishment.

Midwifery. By ten teachers. Fifth edition, 740 pages, illustrated. Price $5.50. Arnold, London; Macmillan, Toronto, 1935.

This well-known work appears in its fifth edition under the direction of Clifford White. The text has been brought up to date by the inclusion of recent work and new methods of treatment, particularly regarding the physiology of menstruation, the Zondek-Ascheim test as a means of diagnosis of pregnancy, the ovarian cycle and ovulation, the toxæmia of pregnancy, pyelitis and puerperal infection. Throughout the whole book there is evidence of careful revision and the avoidance of out-worn methods of treatment, though intravenous infusion by cutting down upon and opening the vein instead of introducing a hollow needle into its lumen is given first place and has three figures devoted to it. Also, under the treatment of placenta prævia no mention is made of the value of blood transfusion in the case of an exsanguinated mother before manipulations to effect delivery are begun. These, however, are minor objections, and in general the methods of treatment advocated are sound and practicable. The treatment suggested for asphyxia neonatorum is admirable.

This fifth edition is an improvement on its predecessors, good as they were, and to the student approaching the study of obstetrics for the first term the book can be recommended as a safe and valuable guide, while the established practitioner may turn to it with profit, since he will find therein the latest knowledge concentrated and clarified for his benefit.

Surgical Pathology of the Peritoneum. A. E. Hertzler, M.D., Surgeon to Agnes Hertzler Memorial Hospital, Halstead, Kansas. 304 pages, illustrated. Price $5.00. Lippincott, Philadelphia and Montreal, 1935.

This volume is another in the series of monographs on Surgical Pathology published by Professor Hertzler. It is attractively bound and printed and the numerous illustrations are excellent. To those familiar with the author's previous publications it will be no surprise to find that the volume is stimulating to a degree. It is to be regretted that at times the forceful style degenerates into slang. For example, "The older surgeons were not so dumb . . .", "Let that soak in . . .". From such leaders as Hertzler we have a right to expect more careful writing than this.

The anatomy and physiology of the peritoneum is adequately covered. His attitude toward the teaching of the former subject is so sound that a quotation is inevitable, ". . . an uncalculable loss was inflicted on surgery when educators transferred the teaching of anatomy from apprentice surgeons to biologists. The study of comparative morphology is nowise a substitute for frequent and prolonged examinations of the anatomy of dead human bodies."

The author refers to himself as an iconoclast in his preface, and it is in the chapter on peritoneal adhesions that he becomes most radical. Those who disagree with his views in this section, as in other parts of the book, will have to admit that they are thought-provoking.

Peritonitis, localized and diffuse, localized abscess, and thrombotic conditions are dealt with, and there is a section on specific peritonitis. Under this head is included the pneumococcic form, and it is surprising to find that the author has seen only two cases. Surgeons of similar experience in the northeastern part of the United States and Canada must all have a much larger series than this. The diseases of the omentum and tumours of the peritoneum complete the volume. A general bibliography is given at the end of each chapter.

All in all, it is a book one is the better for reading, and is recommended to students, both graduate and undergraduate, who do not mind having "brick-bats" thrown at some of the older teachings.

Spleen and Resistance. David Perla, M.D., Associate Pathologist and Bacteriologist, Montefiore Hospital, and Jessie Marmorston, M.D., Associate in Pathology, Cornell University Medical College. 170 pages. Price $2.00. Williams & Wilkins, Baltimore, 1935.

This monograph, which is introduced by Dr. David Marine, is an exhaustive review of the literature pertaining to the spleen and resistance. In the introductory chapter the authors have taken up the anatomical considerations. The second chapter deals with the pathological changes in the spleen as a result of various infections, both acute and chronic, including the so-called virus diseases. Chapters 5 to 8 discuss in detail the effects of splenectomy. The book is of value largely for reference.

The Medical Man and the Witch During the Renaissance. Gregory Zilboorg, M.D. XI and 215 pages, illustrated. Price $2.50. Johns Hopkins Press, Baltimore, 1935.

This is one of the attractive publications of the Institute of the History of Medicine of the Johns Hopkins University, and constitutes the second series of the Hideyo Noguchi Lectures. The first of these, "The Renaissance of Medicine in Italy", by Arturo Castiglioni, was reviewed in these columns a few months ago. Dr. Zilboorg's lectures are equally welcome.

Most of us, probably, have been accustomed to look upon that period of human history in which the witch "phobia" attained its height with loathing and anger, not unmixed with contempt. Perhaps we have been unjust, and, at least, until superstition has been banished from our midst (which event is not yet) we cannot well afford to assume the mask of smug superiority. As Dr. Sigerist puts forth in his preface to the work under review, "Medical history cannot be understood without a careful consideration of the cultural backgrounds with all their implications". Dr. Zilboorg applies this principle to the study of witchcraft and demoniacal possession and shows us

how, at a time when the outlook was darkest, the modern science of psychiatry was born.

It is a truism to say that a belief in the supernatural is as old as the race. Superior beings, good or bad, played a controlling part in human action. It was easy therefore, to accept the view that such beings could enter in to the human body and compel it to obey their behests. Hence the doctrines of demoniacal possession and collusion with evil spirits. Gradually such notions became more widespread, and, with the ascendancy of the Church, with its literal interpretations of phenomena, became crystallized into rigid modes of thought and action. The leaders in Church and State, and, we regret to say, most of the medical men, did not stop to consider whether "witchcraft" might not have its basis in physical or mental ailments—in other words, in *natural* rather than in *supernatural* causes. It was not that the Age was stupid or ignorant. A period that gave us thinkers as Tycho Brahe, Regiomontanus, Telesius, Erasmus, Melanchthon, Vives, Cornelius Agrippa, Cardanus, Nicholas Cusanus, and, among physicians, Vesalius, Fallopius, Eustachius, Fracastorius, Fernel, Plater, Paracelsus, Ambroise Paré, and Johann Weyer, cannot be called stupid. It was all in the point of view. The scientific outlook was yet to be born; or if born it was still-born. For the times, witchcraft was a reasonable assumption. Gradually it came about that the fear of witches became a veritable obsession; "mass psychology" came into play. The consequence was horrible cruelty under the ægis of religion, law and order. Mental alienation, demoniacal association, and heresy became inextricably intermingled and confused. In his first lecture Dr. Zilboorg deals with the *Malleus Maleficarum*, or Hammer of Witches, the production of two Dominican monks, Johann Sprenger and Heinrich Kraemer, who constituted themselves what we might term *advocati contra Diabolum*—a truly terrible exposition of the subject. In his second, he discusses Medicine and the Witch in the Sixteenth Century, and shows how the medical profession were either imbued with the current opinions about witchcraft, or, if they thought otherwise, were content to stand aloof, with the notable exception of Paracelsus, Cornelius Agrippa, Lemnius, and Johann Weyer and one or two more. In his third, he introduces Weyer as a great clinician and the "Father of Psychiatry". Weyer recognized that these cases of "possession" were examples of mental disturbance, of *natural* and not *supernatural* etiology, and that they could be treated successfully along medical lines. He scouted the influence of the devil and his angels—and this at a time when he risked his life to say so. All honour to him! Read Dr. Zilboorg's book. It is entrancingly interesting, informative, and illuminates a hitherto neglected page of history.

The Physical and Mental Growth of Prematurely-born Children. Julius H. Hess, M.D., Professor of Pædiatrics, College of Medicine, University of Illinois, Chicago; George J. Mohr, M.D., and Phyllis F. Bartelme, Ph.D. 449 pages. Price $5.00. The University of Chicago Press, 1935.

This very excellent book is the product of recognized authorities on the subject of prematurely-born children. It contains much original research material. Divided into three parts, the first is "A Clinical Study", by Dr. Hess. The second part is of unusual interest, because in it Drs. Mohr and Bartelme report most striking observations on both the mental and the physical development of prematurely-born children. The third and last part is a series of chapters by various authors on "Special Studies Carried out in the Premature Infant Station". The book will be of value to those responsible for the care of children of this group, and will provide much interesting material for those with a special interest in child development. It will also serve to stimulate provision of better facilities for the care of children born prematurely outside of institutions. The book is of real value as a contribution to the literature on this particular subject.

The Hygiene of Marriage. Isabel Emslie Hutton, M.D. Fourth edition. 146 pages. Price 5/-. William Heinemann, London, 1933.

To combat unhappiness, anxiety and general ill-health in married people through education in the subject of marriage, is the aim of this book, first published in 1923. The titles of the chapters give a good idea of the field covered: Preparation for Marriage; Consummation of Marriage; Married Life; Menstruation and the Menopause; Childlessness; Birth Control; Contraceptives. This book is not propaganda for birth control, but, in view of the wide practice of birth control, considers that information on the subject must be included. There is no doubt that such a book is needed, and it would be desirable for medical practitioners to be familiar with it so that they might consider recommending it, and, perhaps, it would enable them to correct for their clients the occasional statement, such as, for example, that mental and nervous diseases are almost unknown in Jugo-Slavia. This book can be recommended.

Theory and Practice of Nursing. M. A. Gullan, S.R.N., Sister Tutor, St. Thomas's Hospital, London. Fourth edition, 259 pages, illustrated. Price 9s. net. H. K. Lewis & Co., London, 1935.

The fourth edition of this well-known work on the practice of nursing brings up to date a very helpful and practical volume on nursing methods. The chapters summarize the instructions on the theory and practice of nursing given to the nurses in training in the Nightingale School of St. Thomas's Hospital. As they are designed to supplement ward instruction, much routine detail has been omitted, and the aim has been so to present nursing methods, with their underlying principles and purposes, that they shall not degenerate into mechanical performances. More information is included on dietetics, drugs, solutions, bacteriology and physiology than is included in many text-books on the practice of nursing. In this fourth edition some revisions and additions have been made to the sections on Elemental Dietetics, Lavage, Local Applications, Baths and Infectious Fevers. It is a readable book, with frequent blank pages for additional notes. It does not give more detail than would seem required by the nurse for the intelligent conduct of her work.

The Diseases of the Endocrine Glands. Hermann Zonkek, M.D., Director of the Medical Division, Bikur Cholim Hospital, Jerusalem. Third edition revised and enlarged. Translated by Carl Prausnitz, M.D., M.R.C.S., L.R.C.P., Honorary Research Fellow, Victoria University of Manchester. 492 pages and 168 figures. Price $12.00. Arnold, London; Macmillan, Toronto, 1935.

The last German edition of this work appeared in 1926. The translator and author have followed the plan of that work and have brought it up to date by taking account of the recent advances in our knowledge of the physiology and pathology of internal secretion. The first hundred pages deal generally with the physiology and chemistry of the hormonal glands and their relation to the nervous system. Primarily a work for the practising physician, about 350 pages are devoted to the specific diseases caused by or probably due to disturbances of the hormonal glands. Diseases of the thyroid gland naturally receive extensive notice, for our knowledge of these diseases has had a great bearing on the study of other glands with internal secretions. The author's wide acquaintance with the literature of the subject is evident in his writing, and this had been ably supplemented by his own personal observations. The

clinical cases presented are principally from his own case records and he writes with large experience. A good bibliography is appended for each chapter. That it is a book for the general practitioner as well as for the internist is indicated by the discussion at length of such diseases as obesity, tetany, diabetes insipidus, acromegaly, gigantism, dwarfism, osteomalacia, status thymico-lymphaticus, as well as diseases of the generative system due to disorders of internal secretion. The photographic illustrations of clinical cases will prove helpful to the reader.

Human Personality and the Environment. Charles M. Campbell, Professor of Psychiatry, Harvard Medical School. 247 pages. Price $3.60. Macmillan, New York and Toronto, 1934.

This interesting volume is based upon a series of lectures given at the Lowell Institute, Boston. Personality signifies the individual in his reaction to his environment as well as in his inner experience, so it follows that an understanding of personality is essential to the physician who deals adequately with the sick person. "The physician has before him a person in trouble, and, no matter whether the presenting symptom be gastric discomfort or a twisted philosophy of life, his task forces him to scrutinize all the various systems which are integrated into the total personality."

The first chapter is an account of the effects of altitude, cold, and hunger upon human behaviour and feelings. Many interesting quotations are given from the personal experience of explorers, mountain climbers, etc. The conclusion is that the physico-chemical system of the environment has a profound effect on personality. Following this comes a chapter which deals with the relationship of the endocrine glands to personality. The third chapter traces the development of the individual from the fertilized ovum, and considers heredity and the influence of cultural environment. Emphasis is placed upon the influence of pleasure and pain on the personality, which, with the pressure of the social environment, are considered the major influences in the child's individual development. The variations in individuals are well presented. How the personality as a whole deals with the tasks of life is well told, with many interesting examples from well-known lives. The last chapter logically describes "individual attempts to do justice to the needs of his own complex nature and to play his rôle in the endless drama of the universe". Here we learn something of Beethoven, Turner, Father Doyle, Saint Teresa, Schopenhauer, and others.

This is a book to be read for pleasure as well as instruction. It gives a well-rounded presentation of an important subject, and, as such, is recommended to the medical profession.

Methods and Materials of Health Education. Jesse F. Williams, M.D., Teachers' College, Columbia University, and Fannie B. Shaw, M.A., University of Florida. 331 pages. Price $2.50. Thomas Nelson & Sons, New York and Toronto, 1935.

The title of this book will be misleading to many unless they are familiar with the report of the Committee on Terminology of the Health Education Section of the Physical Education Association, which report is freely quoted, including this definition: "Health Education is the sum of all experiences which favourably influence habits, attitudes, and knowledge relating to individual, community, and racial health".

On this broad basis, there are three divisions of health education for the school child, namely Health Service, Healthy School Living, and Health Instruction. These subjects are the main consideration of the authors, who have, however, included a chapter on "The Nature of the Child" as fundamental to a consideration of health education.

Each chapter gives a list of suggested questions for study and consideration. Many references are added as footnotes. The book appears to have made a fair and readable presentation of the subject. It has perhaps included too much in its insistence upon considering all the factors which might exert an influence upon the child. School medical officers, public health nurses and school teachers will find much of interest in the book, and will profit by the many stimulating suggestions.

1,000 Questions and Answers on T.B. Edited by Fred. H. Heise, M.D., Medical Director, Trudeau Sanatorium, and Question Box Editor, *Journal of the Outdoor Life*. 232 pages. Price 75c. Published by Journal of the Outdoor Life, 50 West 50th St., New York City, 1935.

Taking the questions which have come to him to be answered, in his association with the *Journal of the Outdoor Life*, Dr. Heise has grouped them in such a way that he appears to have given an answer to any question which might be asked on the subject of tuberculosis. This is well done, and an excellent reference book has been provided for the tuberculous. The book will also be of value to those engaged in health instruction, particularly among the tuberculous and their families. This is one more worth-while accomplishment by the *Journal of the Outdoor Life* which has already done so much to aid the tuberculous in their efforts to regain health.

BOOKS RECEIVED

Transactions of Ninth Congress of Far-Eastern Association of Tropical Medicine, held in Nanking, October 2 to 8, 1934. Two volumes, edited by Wu Lien-Teh, Director, and C. Y. Wu, Senior Medical Officer, National Quarantine Service. Published by National Health Administration, Nanking, 1935.

Ideal Health, or the Laws of Life and Health. Alexander Bryce, M.D., C.M., D.P.H. Third edition, 340 pages. Price $1.50. John Wright & Sons, Bristol; Macmillan Co., Toronto, 1935.

Mother Marianne of Molokai. L. V. Jacks. 203 pages. Price $2.40. Macmillan Co., New York and Toronto, 1935.

Safety in Spray Painting. 104 pages. Price $1.00. Published for International Labour Office, Geneva, by P. S. King & Son, Ltd., London, 1935.

Clinical Management of Syphilis. Alvin R. Harnes, M.D., Chief of Congenital Luetic Clinic, New York Hospital. 71 pages. Price $1.80. Macmillan Co., New York and Toronto, 1935.

Infantile Paralysis. George Draper, M.D., Associate Professor of Clinical Medicine, College of Physicians and Surgeons, Columbia University. 167 pages. Price $2.00. D. Appleton-Century Co., New York and London, 1935.

Collected Papers of Mayo Clinic. Vol. 26, edited by Richard M. Hewitt, B.A., M.A., M.D. and Lloyd G. Potter. 1,192 pages, illustrated. Price $12.75. W. B. Saunders, Philadelphia and London, 1935.

International Clinics. Vol. 2, forty-fifth series. Edited by Louis Hamman, M.D., and others. 327 pages, illustrated. Price $3.00. J. B. Lippincott, Philadelphia, London and Montreal, 1935.

Medical Annual. Year Book of Treatment and Practitioner's Index. 600 pages, illustrated. Price $6.00. John Wright & Sons, Bristol; Macmillan Co., Toronto, 1935.

To Remind, a Biological Essay. Sir William B. Hardy, M.A., F.R.S., Hon. D.Sc., Hon. LL.D., Abraham Flexner Lectures, No. 2. 45 pages. Price $1.00. Published for Vanderbilt University by Williams & Wilkins, Baltimore, 1934.